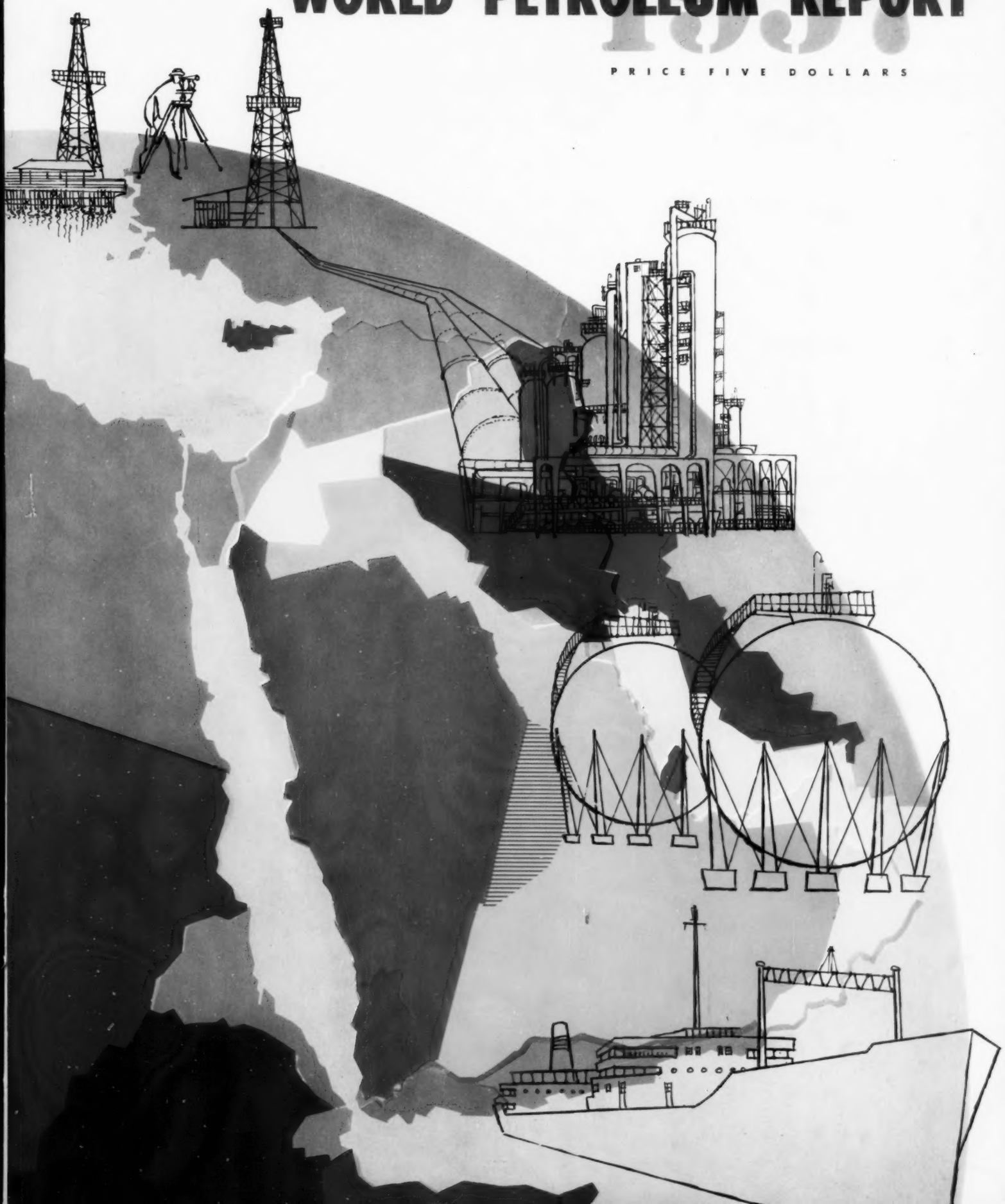
WORLD PETROLEUM REPORT 1957

PRICE FIVE DOLLARS



When you make your derrick man reach out and wrestle the elevator with every stand of pipe, you are wasting drilling time and money . . . and sacrificing safety.

If you don't have a Hook Positioner you're sacrificing Time, Money and Safety!

Here's where Byron Jackson's *exclusive* hook feature pays off. The BJ Hook Positioner automatically rotates the elevator into the correct position for the derrick man. Elevator handles and door are ready for instant, easy latch-on. There's no groping, grabbing and griping.

The BJ positioner consists of a cam follower which travels on a hardened cam track. The cam follower may be set and locked in any of 24 regular positions. Whenever the load is released from the hook, the cam follower travels upward until it contacts the cam surface on the housing. It then automatically travels on the cam surface and rotates the hook body to the predetermined position. This accurately locates the elevator door handles so that the derrick man can quickly, easily and safely latch-on the next stand.

Don't make a monkey out of your derrick man. Make your next hook a BJ Hook with *exclusive hook positioner*. You'll save money . . . with safety!

Here's How It Works!

Elevator at monkey board has door handles perfectly positioned for derrick man to load stand.

Going in hole, conditions such as crooked hole, bridges, etc. rotate hook body and elevator.

At rig floor, slips take load and BJ Positioner automatically rotates hook body to pre-set position.

Elevator is fully re-positioned into correct working position—for elevator opening at floor and for instant latch-on at board.

Watch BJ Red for the Newest

Byron Jackson Tools, Inc.

A Subsidiary of Borg-Warner Corporation

P. O. Box 2017A Terminal Annex, Los Angeles 54, California

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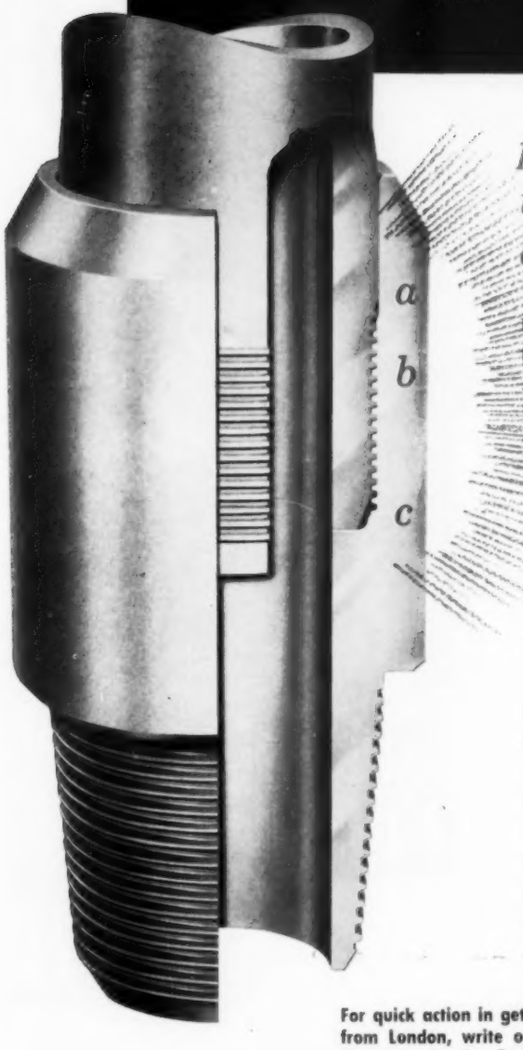
The Reed Super Shrink-Grip
FIELD REPLACEABLE tool joint



protects your drilling string investment—against twist offs, against washouts, against leaks

BECAUSE: *a*. The Shrink-Grip "safety area" supports the drill pipe beyond the threaded section . . . and seals against leakage. *b*. Entire thread length is protected by seal at each end. *c*. Fixed landing shoulder assures proper make-up . . . and effects a seal.

extends your drilling string investment to drill "extra wells"

BECAUSE: The "field replaceable" feature of the Reed Super Shrink-Grip Tool Joint enables the operator to: 1. SAVE PIPE by reversing ends before excessive slip wear; 2. SAVE PIPE by replacing tool joint damaged by careless handling; 3. SAVE TOOL JOINT when pipe is bent or crushed; 4. SAVE PIPE when tool joints wear out after they have served their time in giving long trouble-free service.

For quick action in getting complete information . . . in oil areas served from London, write or wire Reed Roller Bit Company, Moorgate Hall, Moorgate, London E. C. 2, England. Cable Address "REEDBIT LONDON."

REED ROLLER BIT COMPANY
HOUSTON 1, TEXAS

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NEW YORK LONDON BUENOS AIRES

Gulf Coast, Mid-Continent, Rocky Mountain and Canadian Distributor for Martin-Decker Products

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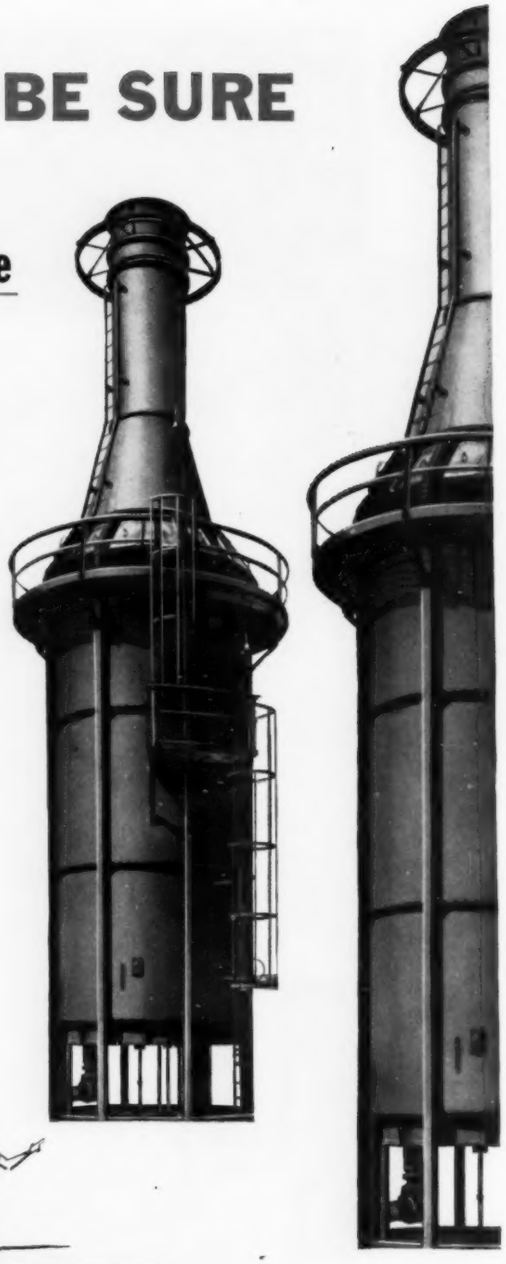
YOU, too, CAN BE SURE

petrochem-isoflow furnaces

are most economically desirable

by any comparison



Whenever *all* the specifications and *all* the operating requirements are applied to direct-fired furnace design, you can be sure PETROCHEM-ISOFLOW FURNACES will be found most economically desirable, by any comparison.

In making comparisons it is essential to take these factors into consideration:

1—Average radiant transfer rate.
2—Maximum deviation from average radiant transfer rate.
3—Average and maximum transfer rate in convection section.
4—Maximum tube wall temperature, radiant or convection.
5—Maximum efficiency with specified excess air.
6—Controlled thermal recirculation of flue gases to provide even heat distribution throughout full length of each tube and equalized heat distribution around each tube.
7—Overload and corresponding transfer load.
8—Design to provide: structural column supports—Ladders—Platforms—Tube Removal facilities, etc.
9—Degree of assembly; of the furnace structure and of the heating surface.

When you specify PETROCHEM-ISOFLOW FURNACES . . . you'll be in good company. More than 1500 are now in service, performing to the complete satisfaction of their operators and usually well beyond their rated capacities.

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The fact that oil companies have run more than a million Schlumberger operations can be attributed to ... continuous research ... engineering ... extensive field experience ... all have combined to provide the industry with the very best in new and improved services year after year.

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1940 Surface Controlled Directional Survey
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1946 The Magnetic Casing Collar Locater
1947 The Induction Log
1947 The Resistivity Dipmeter
1949 The MicroLog
1950 The Laterolog
1951 The Microlaterolog
1951 The Expendable Perforator
1952 The Continuous Resistivity Dipmeter
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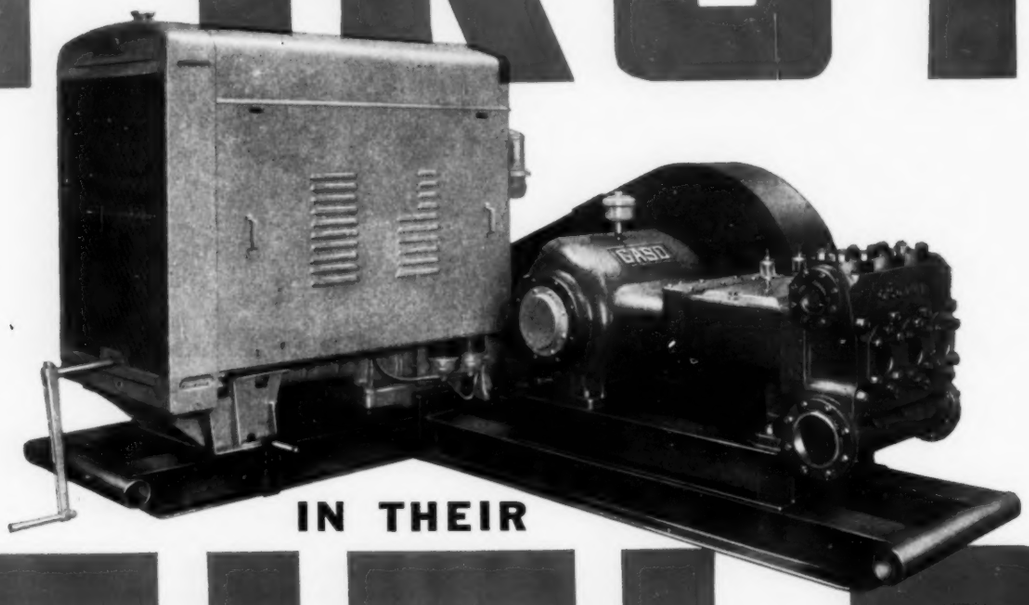

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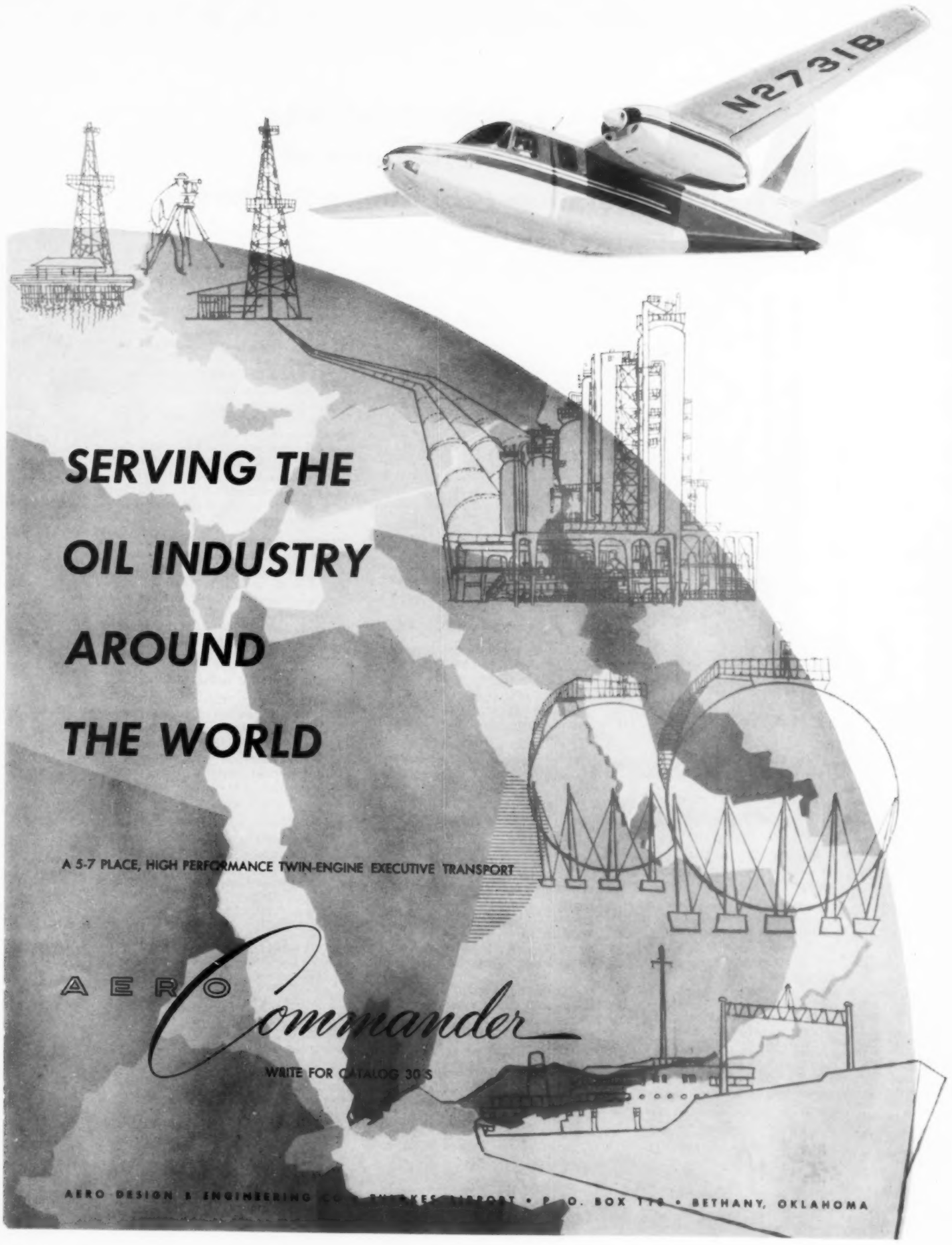
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"Universal" Aptly Describes Range of Applications of BAKER Retainer Production Packer

Baker Retainer Production Packer
Product No. 415-D

Baker Locator Tubing Seal Assembly
Product No. 442-E2

ADVANTAGES of the Baker Retainer Production Packer:

1. *Forms positive, leak-proof pack-off against any pressure differential from either above or below the packer that is safe for the casing.*

2. *Pack-off achieved without excessive et-down tubing weight, or tubing in ension.*

3. *Permits tubing string to be anchored to the packer, released from the packer, or completely removed from the packer, all at the discretion of the operator.*

4. *Complete removal of the tubing string from the packer will not disturb the isolation of the zone below the packer, provided the pressure differential is from below the packer.*

5. *Pack-off remains leak-proof under conditions of high temperature, even under pressure differentials that exceed the safety limits of the casing.*

6. *Can be set on wire line, tubing or drill pipe.*

In practically every production application the Baker Retainer Production Packer has earned the designation "Universal" Type; and it appears also to be the answer to many future production problems.

The range of applications is further broadened by its ability to hold high pressures from above or below—at record or shallow depths—even under temperatures in excess of 300 degrees Fahrenheit.

Because it can also be used successfully as a squeeze tool, it is ideal for testing, acidizing, formation fracturing, squeeze cementing, and other operations required in the completion or work-over phases of a well.

The following actual field records of general production, as well as supplemental applications of this "Universal" Type Packer may indicate a solution to your well problems:

PRODUCTION APPLICATIONS

Single-Zone Production—More Baker Retainer Production Packers are used for single-zone production than for any other application—proof of their increasing and widespread usage in a field previously dominated by retrievable type packers.

Dual-Zone, Single-Packer Application—The majority of dual-zone applications of the Baker Packer are single-packer, dual-zone installations. Because of its remarkable ability to maintain the absolute separation of two zones, this packer is widely known and accepted as the ideal dual-zone packer.

Dual-Zone Production (Baker Selective Hook-Up), Two-Packer Installation—This efficient hook-up enables the operator to produce (pump or flow), treat (formation fracture, acidize, etc.), or test either zone selectively through the tubing, while simultaneously producing the remaining zone through the annulus. The switch in flow, or selection of a zone for treatment, is accomplished at the discretion of the operator, using an instrument line.

Permanent-Type Well Completions—Long recognized as the world's most permanent production packer, the Baker Retainer Production Packer was accepted early in the development of this new completion idea as OUTSTANDINGLY FIRST for Permanent-Type Well Completions.

Parallel Tubing Installations—When a *single* packer is used, each tubing string can be run or pulled independently of the other, and by using a special Anchor and a Latching Sub, the short string can readily be anchored to the long string.

When *two* packers are used, each string is run or pulled separately, however, the long string must be *run* first, and the short string *pulled* first. Either the single-packer or the two-packer installation features a full opening to the lower zone for use of all permanent completion-type tools.

Off-Shore Installations—The Baker Packer is used in conjunction with a storm choke to prevent loss of production due to accidental damage to surface connections of off-shore installations. Permanence, plus the ability of the packer to hold mud weight above the packer are additional factors that recommend its use in this application.

SUPPLEMENTAL APPLICATIONS

In addition to its use in practically every type of production application, the Baker Retainer Production Packer can also be used effectively as a squeeze tool in the following wide variety of "Supplemental" applications that might be required in the completion or work-over phases of a well:

Testing—As many as ten Baker Packers have been used in a single well for an efficient, complete bottom-to-top testing program. Ability of the packer to withstand reverse in pressure differential from high-pressure acid squeeze to swabbing enhances its use as a successful testing tool.

Acid Squeeze, Formation Fracture, or Squeeze Cementing—Use of the Baker Packer as a squeeze tool in either the initial completion or during subsequent work-over is widespread, due to elimination of the unnecessary additional expense of running a separate squeeze or testing tool.

Water Flood or Gas Injection—The permanence of the Baker Retainer Production Packer, plus the advantage of a free tubing string, make it a superior packer for secondary recovery instal-

lations. The packer has also been used in dual-zone wells where one zone is produced, with simultaneous injection into the other.

Isolation of Annulus—The Baker Packer is corrosion resistant. This feature, plus the fact that the packer permits removal of the production string without disturbing the isolation of the zone below the packer (pressure differential must be from *below* the packer) make it an ideal packer for use in corrosive areas where protection of the casing above the producing zone is of great importance.

Bridge Plug, Temporary or Permanent—The Baker Packer acts as a one-way bridge plug whenever the tubing is removed from the well, provided the pressure differential is from below the packer. It can easily be converted to a temporary two-way casing bridge plug or a permanent bridge plug.

POPULAR APPLICATIONS OF: the Baker "Universal" Type Retainer Production Packer

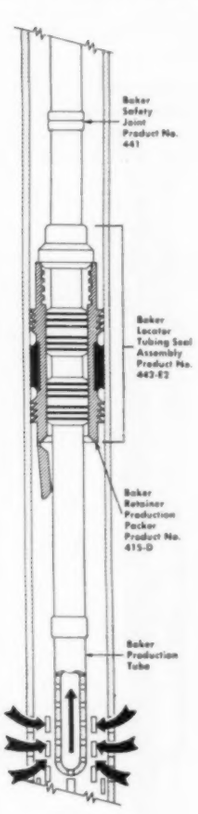
Baker Safety Joint Product No. 441
Baker Locator Tubing Seal Assembly Product No. 442-82
Baker Retainer Production Packer Product No. 415-D
Baker Production Tube

Fig. 1

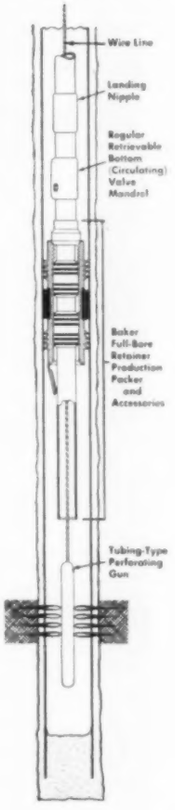
Wire Line
Landing Nipple
Regular Retrievable Bottom (Circulating) Valve Mandrel
Baker Full-Bore Retainer Production Packer and Accessories
Tubing-Type Perforating Gun

Fig. 2

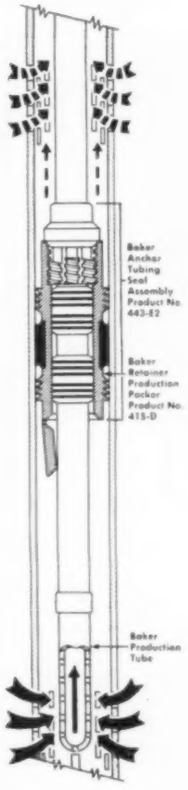
Baker Anchor Tubing Seal Assembly Product No. 442-82
Baker Retainer Production Packer Product No. 415-D
Baker Production Tube

Fig. 3

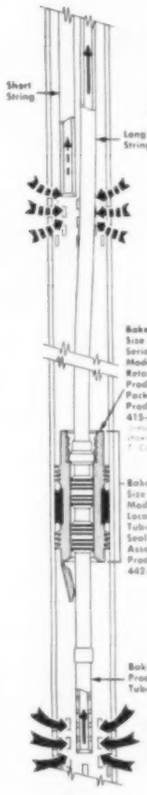
Short String
Long String
Baker Size 100 Series Model "D" Retainer Production Packer Product No. 415-D
Baker Size 100 Model "E" Locator Tubing Seal Assembly Product No. 442-82
Baker Production Tube

Fig. 4

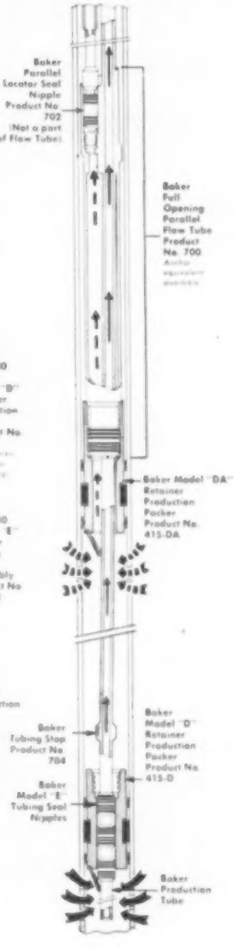
Baker Parallel Locator Seal Nipple Product No. 702 (Not a part of Flow Tube)
Baker Full Opening Parallel Flow Tube Product No. 700
Baker Model "DA" Retainer Production Packer Product No. 415-DA
Baker Model "D" Retainer Production Packer Product No. 415-D
Baker Tubing Stop Product No. 704
Baker Model "E" Tubing Seal Nipples
Baker Production Tube

Fig. 5

SINGLE-ZONE Fig. 1.—Illustrates Packer set in casing with Locator Tubing Seal Assembly and Production Tube installed for single-zone production.

PERMANENT-TYPE WELL COMPLETION Fig. 2—Illustrates typical Permanent-Type Well Completion Hook-Up showing perforating operation through and below the packer.

DUAL-ZONE, SINGLE PACKER Fig. 3—Illustrates Packer set in casing with anchored production string for dual-zone production. Tubing can be released from packer by rotating to right.

DUAL-ZONE, PARALLEL STRINGS, SINGLE PACKER Fig. 4—Illustrates the simplest form of parallel string installation. A variation permits anchoring short string to long string, if desired. Note full opening to lower zone for use of all permanent completion-type tools.

DUAL-ZONE, PARALLEL STRINGS, TWO PACKERS Fig. 5—Illustrates two-packer parallel string installation with each zone confined to its individual tubing string, with full opening to lower zone for use of all permanent completion-type tools.

How to get complete information...

A new 72-page catalog supplement is now available on the Baker Retainer Production Packer and its many features and applications. Address any office, or ask your Baker representative for Baker Catalog Supplement No. 502.

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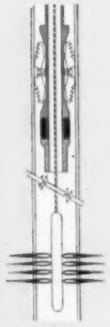
HOUSTON • LOS ANGELES • NEW YORK

Here's what you can do with the

BAKER FULL-BORE RETRIEVABLE CEMENTER

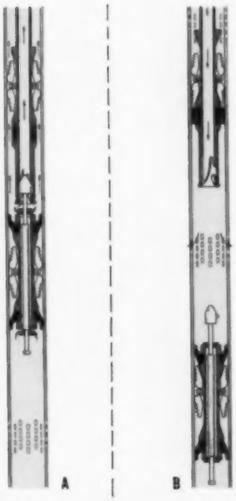


PERFORATE

FRACTURE ACIDIZE CEMENT

SWAB AND TEST

or use it with a **BAKER RETRIEVABLE BRIDGE PLUG** for as many straddle operations as required... in **ONE ROUND TRIP!**



A — Run tools in together

B — Release Plug, straddle interval, fracture or acidize

C — Swab and Test

D — Pick up plug, move to next interval

here's why it does these jobs better...

HOLDS HIGH PRESSURES FROM ABOVE OR BELOW
Contains two sets of opposed "Rocker-Type Slips". Once packing element is packed off, pressure from above or below is automatically transferred through the proper set of slips to the casing.

FULL-BORE (Tubing I.D.) permits passage of instruments, or guns; prevents "screen-out" during fracturing operations.

Baker Full-Bore Retrievable Cementer Product No. 410

BAKER
OIL TOOLS, INC.
HOUSTON • LOS ANGELES • NEW YORK

Write for Catalog Supplements 319, 322, 323 for complete information on these products and their applications.

Foreword

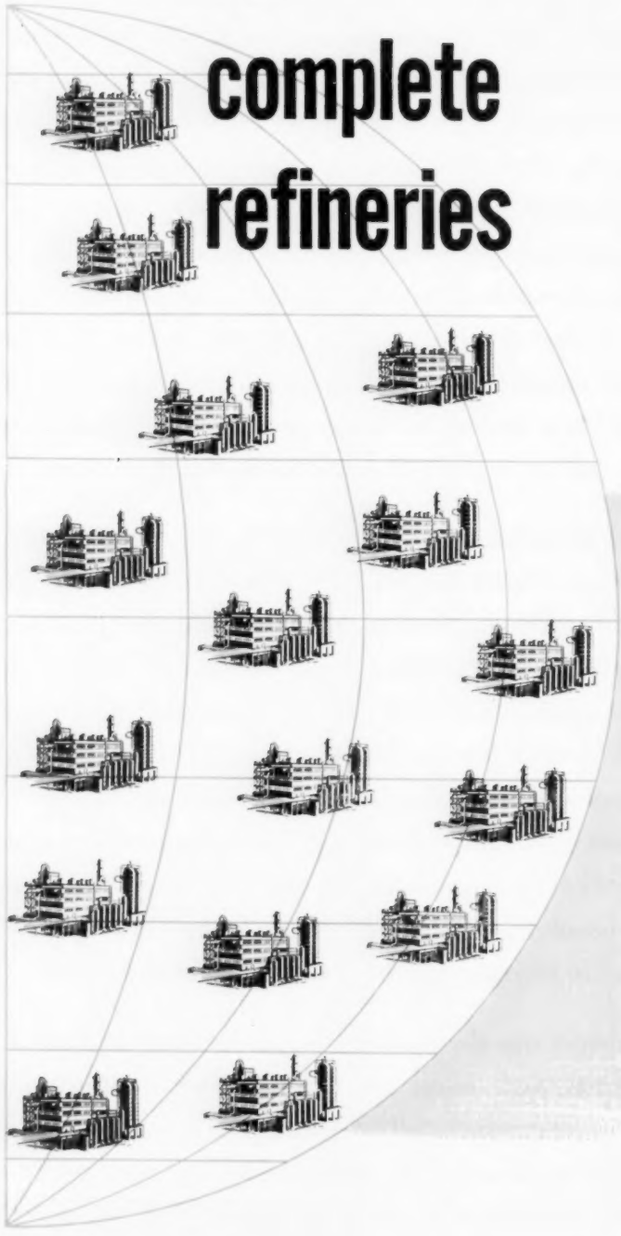
For the use of companies interested in oil development around the world, this issue summarizes for the first time all the major factors affecting oil in the 64 countries and areas reviewed. Briefly, these factors cover: one, physical development of the oil industry; two, petroleum laws; and three, the multiple national factors affecting oil investment such as labor laws, exchange regulations, or corporate ownership and taxation. This is the first time that all this material, particularly that dealing with regulation of the petroleum industry around the world, has been assembled in one source. Its compilation has taken the author to over 45 countries in the past several years.

The tremendous expansion of the international petroleum industry created the need for such a study. In the past decade production in the free world outside the United States has tripled, while production in the United States has doubled. The explosive growth rate of oil consumption throughout the world calls for the Middle East to double its production to supply Western Europe's needs alone during the coming ten years. Asia, Australasia and Latin America are expanding oil needs even more rapidly, while the United States is faced with an absolute decline in crude production shortly following 1965 and an increasing dependence on foreign sources.

To meet this demand oil companies large and small are going outside their home countries to seek production in foreign areas. We respectfully dedicate this issue to those companies, which at considerable risk are keeping pace with the tremendous expansion of the international petroleum industry and upon whom the free world must rely for the majority of its energy requirements.

Gordon H. Brown

16 complete refineries



1945

1. Refinery for B. P. M. at Cardon, Venezuela.
2. Refinery for Koppartrans Oljeaktiebolag at Gothenburg, Sweden.
3. Refinery for Venezuela Gulf Refining Company at Puerto La Cruz, Venezuela.
4. Refinery for Societe Generale des Huiles de Petrole at Dunkirk, France.
5. "Portable" refinery for U. S. Navy Department.
6. Lube oil refinery for Cit-Con Oil Corporation at Lake Charles, Louisiana.
7. Refinery for International Refineries Inc. at Wrenshall, Minnesota.
8. Refinery for Vacuum Oil Company Ltd. at Coryton, England.
9. Refinery for Burmah-Shell Oil Company at Bombay, India.
10. Refinery for Standard-Vacuum Oil Company at Bombay, India.
11. Refinery for Standard Oil Company (Indiana) at Mandan, North Dakota.
12. Refinery for Suntide Refining Company at Corpus Christi, Texas.
13. Refinery for Commonwealth Refining Company at Ponce, Puerto Rico.
14. Refinery for Esso Standard Oil Company at Antwerp, Belgium.
15. Refinery for Caltex at Visakhapatnam, India.
16. Refinery for Neste Oy at Turku, Finland.

1955

In the past 10 years alone, Lummus has completed or is currently working on 16 complete refineries. Combined, they represent a large percentage of the refinery capacity constructed in the last decade.

But complete refineries are only part of the Lummus story. Separate units for any and all phases of refining from distillation to petrochemical production have been designed, engineered and built by Lummus – as additions to existing installations or as integral parts of new construction.

In the past 50 years, Lummus has added over 700 petroleum and chemical plants and installations to the world's total. Think of Lummus when planning your next project.

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WORLD PETROLEUM REPORT

AN ANNUAL REVIEW OF INTERNATIONAL OIL OPERATIONS

VOLUME III—JANUARY 15, 1957

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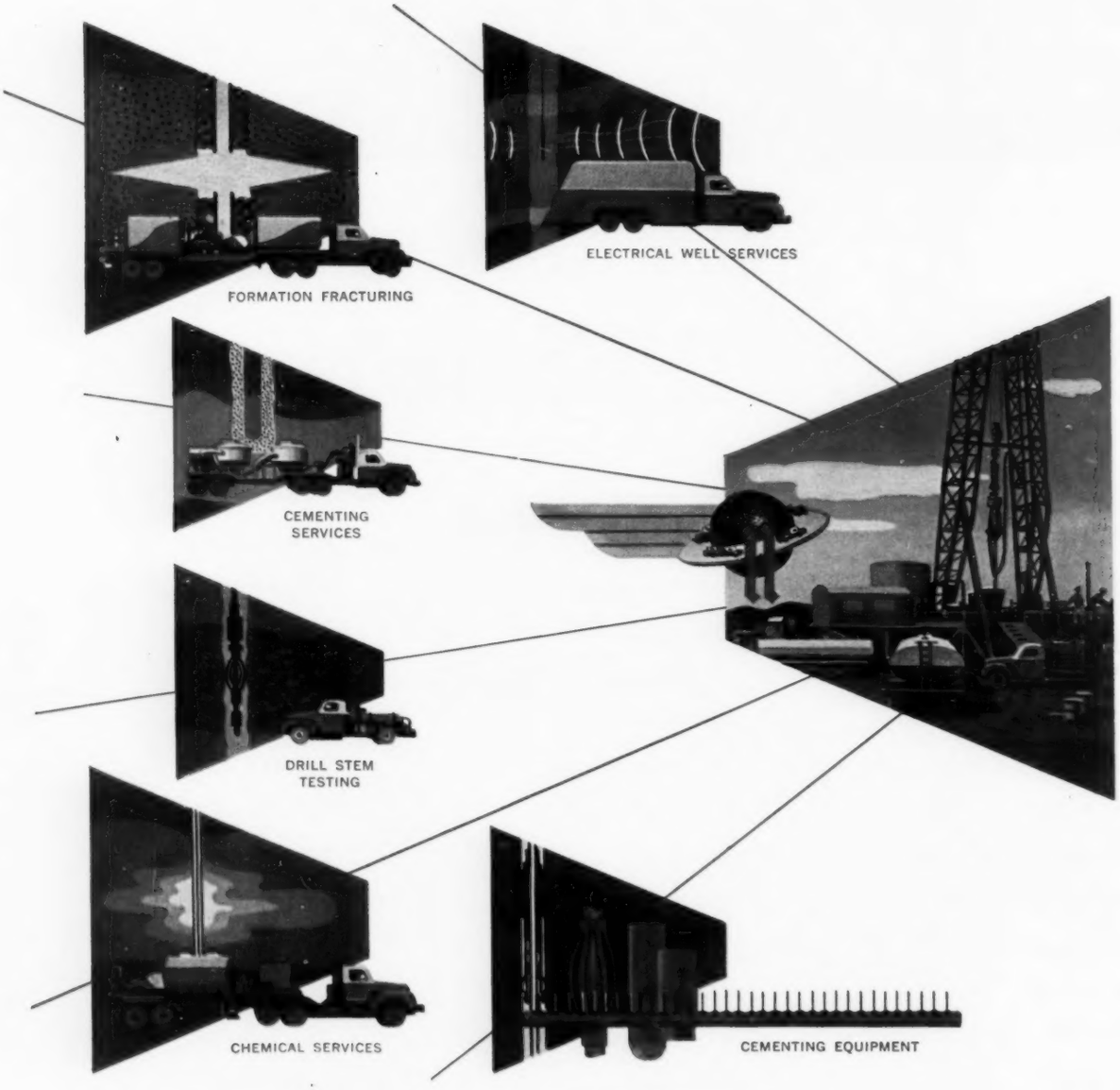


LET YOUR WELL SAY WHICH

HALLIBURTON

OIL WELL CEMENTING COMPANY

DUNCAN, OKLAHOMA

"PROGRESS IN SERVICE THROUGH RESEARCH"

When one good source has all these services, none need be unduly emphasized. The well alone says which is the best completion treatment. Halliburton long ago expanded its areas of service to include these six closely integrated divisions. They're "All for Oil"... each of the six was added for the sole purpose of helping to put more oil in your tanks. And each service is being constantly improved and developed by Halliburton's tremendous research program... which makes research our most important service. At Halliburton, there's no reason to recommend one service over another... we let the well say which.

THE WORLD

Exploration

Recent years have seen an unusual amount of exploratory activity by the so-called "independent" petroleum companies of the United States which have expanded their activities abroad, along with enlarged activities by the major oil companies.

The expansion of exploratory activity by all parties has been particularly marked in the Western Hemisphere. Renewed interest has been shown in Alaska, where an oil search of many years' standing has picked up a little, and where several exploratory wells have been drilled. The principal explorer has been Phillips Petroleum Co., whose third exploratory well still has not brought in production.

Canada has not seen a major exploratory find since 1952, when the Pembina field was discovered. However, a number of smaller fields have contributed to a high level of activity; and, during 1956, the Granite Wash discovery in northern Alberta seemed likely to become of major importance.

Activities in the United States in 1956 were concentrated in the Four Corners area, and in the offshore areas of Louisiana, Texas, and California—to mention the more important. The chances of a really major strike such as the East Texas field, found some 25 years ago, are becoming more remote. Increased costs (although offset somewhat by savings resulting from technological innovations) plus the restrictions imposed by prorationing have made exploration and production abroad attractive.

Interest in the Western Hemisphere has centered on Central America, where the first commercial well was discovered in 1956, and on Venezuela. In Costa Rica the first commercial producer was found by Union Oil Co. of California, in Cocolas No. 2 well near the border of Panama and only a few miles from the Caribbean. This discovery touched off a wave of leasing activity which has extended into Panama. Guatemala passed a liberalized petroleum law, and about 20 companies immediately applied for acreage. Overlapping application delayed grants, and no drilling was begun during 1956.

In Venezuela the first new concession grants since 1945 brought the government nearly half a billion dollars in extra revenue. Many new companies participated in the first round of concession grants, all of them from the Western Hemisphere—although European and Japanese companies were on the scene. Principal interest was in grants in Lake Maracaibo, but the successful applicants concurrently took acreage on outlying districts to conform with the governmental policy of extending the area of exploration to other sections, particularly those lying along the Colombian border.

Elsewhere in South America and the Caribbean there were no major exploratory developments during 1956. Bolivia opened up, for the first time since the 1938 expropriation; and major companies, including Gulf and Shell, returned to explore. Argentina remained closed under the new government which replaced the Peron administration. Brazil, also closed to private capital, carried out an active exploration program; but, despite hopes aroused by good shows in the Amazon basin and other sectors, no discoveries of importance were made. Colombia saw increased activity, but no important exploratory discoveries recently. Chile gave signs of opening up during 1957 under a new law which, however, is said to retain the government's monopoly over producing areas. Activities in Paraguay seemed likely to revive, with several companies interested in the area which Union Oil Co. abandoned during 1955.

The Eastern Hemisphere has seen encouraging discoveries in Europe and Africa, and extraordinary strikes in the Middle East. Esso REP—the affiliate of Standard Oil Co. (New Jersey) with part ownership by Gulf Oil Corp. and the French government—made its Parentis discovery several years ago. The discovery is now producing more than 20,000 b/d. The company made a second discovery at Lucats during 1956. In Italy prospects grew a little cloudy, as the Petrosud Co. (owned by Gulf and Montecatini companies) tested its Cigno discoveries during 1956 under special permit and found them flowing substantial amounts of salt water. This, with the final passage of the long-awaited oil law by parliament in a form which made private operation very difficult, dampened the company's enthusiasm; but substantial applications were made for exploration acreage by other companies—both by private capital and by ENI, the Italian government company. ENI reported a strike in Sicily, at Gela, during the latter part of 1956, and another in the Po valley.

No major strikes were made in any other European country. Germany has continued to make a series of minor finds which serve to raise slightly her production levels. Spain is winding up a long search by Valdebro, owned jointly by independent USA companies and the government—without success.

During the past several years increasing attention has been paid to Africa. Exploration has gone forward in British Somaliland for some years, and in Eritrea—where the Italian government company ENI, plus Sinclair and Conorada companies, has drilled several wells without any discoveries as yet. Gulf Oil Corp. has initiated operations along the Gold Coast, and a discovery in Angola of several years' standing is being developed by Petrofina, although it is short of a major find. In the French territories, especially, considerable exploration is being done. Several producing wells have been drilled by a company in which the French government has a principal interest in Gabon. Shell made a discovery after several years of effort in Nigeria, and is now surveying a sealoading line for the production.

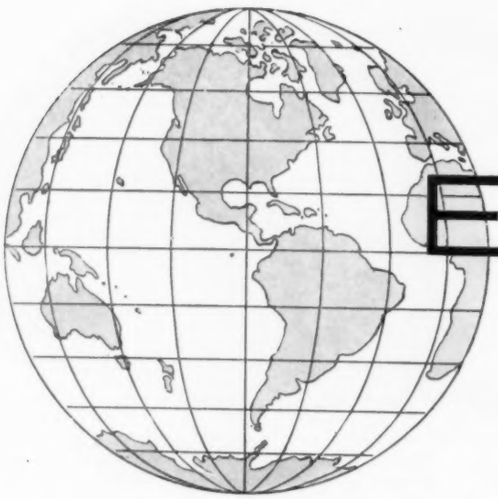
North Africa is especially active. Morocco has been explored only by the French company Ste. Chérifiènne des Pétroles, but American independent companies were known to have expressed interest in the area late in 1956. In Algeria about a dozen companies have been active—all of them owned by the French and Algerian governments, with the Shell group being the only private participant. Discoveries which may be of major importance have been made—the first at Edjele, directly east of Fort Flatters and only a few miles from the border of Libya. Offset wells have been drilled to the original discovery. The latter was followed by another discovery at Tiguentourine and, late in 1956, by another at Hessi Messaoud, just below the oasis of Ouargla. These discoveries are considered of primary importance by the French government. They assume considerable value in view of their position near Europe and on the European side of the Suez Canal, and they might have considerable impact on the world's oil pricing structure if developed. However, they lie across nearly 1,000 miles of

TABLE II—WORLD GEOPHYSICAL ACTIVITY

(First Half, 1956—Party-Months)

Western Hemisphere	Gravity	Seismic	Eastern Hemisphere	Gravity	Seismic
United States	440	3,429	Europe (total)	97	836
Canada	28	751	France	18	127
Mexico	30	98	Germany	30	160
South America (total)	116	273	Italy	12	117
Argentina	18	66	Others	37	66
Brazil	31	36	Africa	116	218
Colombia	24	40	Middle East (total)	53	76
Venezuela	12	98	Aden	6	—
Others	31	33	Dhofar	3	6
			Israel	10	19
Central America (including West Indies)	7	39	Iran	—	3
			Iraq	2	24
Total	621	4,590	Kuwait	—	6
			Persian Gulf	16	—
			Saudi Arabia	10	18
			Turkey	6	—
			Far East	61	72
			Total	948	5,426

Data from Society of Exploration Geophysicists.



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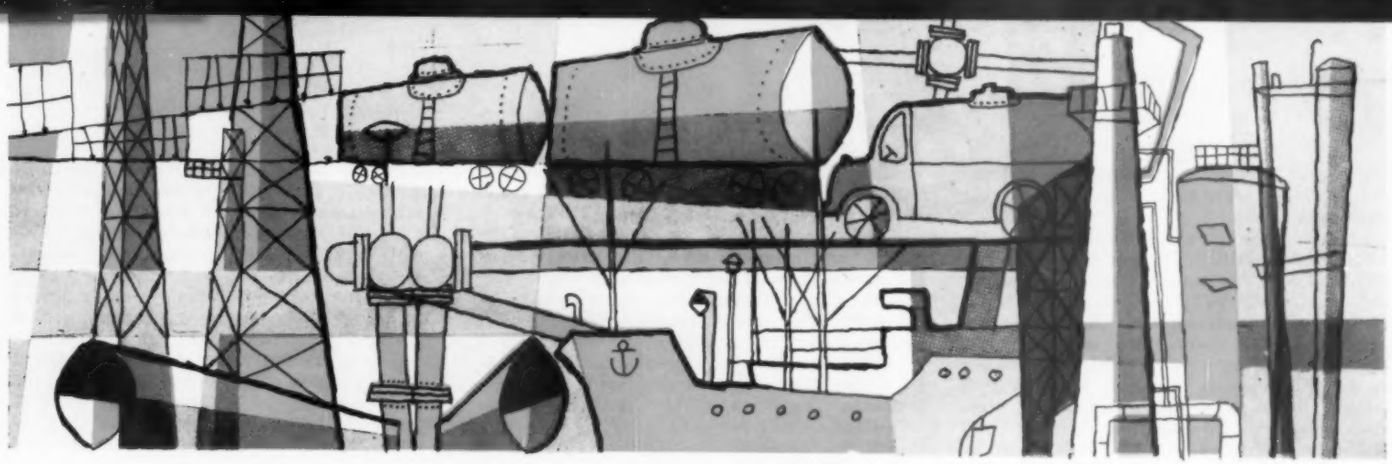

World Functional Division of Major Petroleum Data—Year 1956

(Barrels Daily)

	Production	Refining			Consumption
		No. of Plants	Crude Capacity	Cracking Capacity	
Aden	—	1	120,000	—	69,000
Albania	6,000	1	3,000	—	NA
Algeria	700	—	—	—	NA
Argentina	83,400	17	201,350	76,400 TC	231,000
Australia	—	7	189,500	54,850 C	172,000
Austria	63,800	7	31,720	7,000 T	41,000
Bahrain Island	30,000	1	186,500	36,700 TC	15,000
Belgium	—	8	137,000	29,700 TC	106,000
Bolivia	8,800	4	11,900	—	6,000
Brazil	10,900	9	106,800	13,000 T	202,000
British Borneo	119,400	1	47,500	—	NA
Bulgaria	—	1	9,000(e)	NA	NA
Burma	4,900	2	6,000	—	7,000
Canada	—	43	644,850	341,875 TC	672,000
Chile	9,500	4	20,360	4,960 T	42,000
China	—	1	9,000	—	NA
Colombia	120,400	3	46,500	31,630 TC	51,000
Cuba	1,700	2	8,500	—	63,000
Czechoslovakia	3,000	1	8,500(e)	NA	NA
Denmark	—	3	985	—	76,000
Ecuador	9,800	2	6,050	—	9,000
Egypt	36,600	3	93,000	6,500 T	105,000
Finland	—	1	18,000	—	—
Formosa	—	1	28,000	15,000 TC	10,000
France	24,100	15	503,470	163,650 TC	442,000
Germany (West)	68,000	29	309,170	89,000 TC	296,000
Hawaiian Islands	—	1	3,000	—	NA
Hungary	35,000	3	20,000	NA	NA
India	6,200	3	75,900	19,600 TC	115,000
Indonesia	254,100	5	230,300	44,500 T	80,000
Iran	547,500	3	554,440	130,000 TC	62,000
Iraq	641,800	5	53,130	18,000 T	26,000
Israel	500	1	85,000	23,500 T	30,000
Italy	10,500	34	522,450	64,430 TC	276,000
Japan	6,100	16	290,250	17,770 TC	223,000
Kuwait	1,075,200	1	28,000	—	NA
Lebanon	—	2	20,500	—	29,000
Mexico	255,100	8	428,500	46,500 TC	246,000
Morocco	2,000	1	2,300	1,800 C	19,000
Netherlands	20,600	2	261,000	62,000 TC	157,000
Netherlands West Indies	—	2	650,000	487,000 TC	127,000
Neutral Zone	37,500	—	—	—	—
Norway	—	1	1,800	—	56,000
Pakistan	5,700	1	6,000	—	36,000
Peru	49,900	3	46,000	14,500 T	42,000
Philippine Islands	—	1	13,000	5,400 C	42,000
Poland	7,000	2	10,000	NA	NA
Portugal	—	1	25,000	10,000 C	28,000
Puerto Rico	—	1	10,500	5,000 C	33,000
Qatar	127,500	1	600	—	NA
Romania	223,000	—	190,000	NA	NA
Saudi Arabia	985,300	1	189,000	—	58,000
South Africa	—	2	20,000	7,700 TC	NA
Spain	—	3	80,700	3,500 T	68,000
Sweden	—	4	47,900	1,000 T	175,000
Switzerland	—	2	1,850	—	44,000
Trieste	—	3	32,600	3,000 C	NA
Trinidad	70,000	3	125,000	48,500 TC	32,000
Turkey	5,900	1	7,000	3,000 C	31,000
United Kingdom	1,300	16	599,150	190,500 TC	650,000
USSR	1,568,000	38-70	1,540,000(e)	640,000 TC	1,825,000
United States	7,146,200	318	8,720,000	5,100,000 TC	8,869,000
Uruguay	—	1	28,000	7,000 TC	29,000
Venezuela	2,452,700	11	519,100	78,000 T	136,000
Yugoslavia	3,000	3	19,800	1,100 T	18,000
TOTALS	16,138,600	633	18,204,425	7,903,565 TC	

All figures given are in barrels of 42 US gallons per day. Production for 1956 is partly estimated, based on figures for the first 11 months of the year. All figures, including production, refining, and consumption, are estimated for the Iron Curtain countries, since no official reliable figures are available for these areas.

Under the column headed "Refining," the key to the type of cracking capacity is as follows: T—Thermal. C—Catalytic Cracking. Capacities given are based on throughput per calendar day. The total number of plants does not include the USSR, where the number is unknown. All refining data are as of July 1, 1956.

Under the column headed "Consumption," figures are given in crude equivalent for purposes of comparison with production and refining data. For the approximate actual figure, use 93% of the crude equivalent.

NA—Not Available.

e—Estimate.

the rugged Double Atlas Mountains, and will require large reserves and investment to be developed.

Interest in Egypt was mounting before the recent nationalization, but now the exploratory efforts of such companies as Sahara Petroleum Co. undoubtedly will be reduced considerably because of the government's indicated unreliability toward contractual obligations. In Libya the drafting of a new law has brought in many companies, some of them new to foreign operations, such as Texas Gulf Producing, Hunt Oil interests, and others. An exploratory well in Cyrenaica was begun by Texas Gulf Producing during 1956. Rumors of a discovery were denied by the company.

In the Middle East, Israel continued development of the Heletz field, and renewed interest was shown in Syria and Lebanon. The Arab-Israeli hostilities are certain to delay somewhat this exploratory campaign. Two major strikes were reported in the known oil-rich regions of the Middle East. The Raudhatain discovery by Kuwait Oil Co. was completed as an exceptionally good producer, even by Middle East standards; and Kharsaniya No. 1 by Arabian American Oil Co. also appears to indicate a discovery of importance. In Turkey activity is reaching new highs as many of the "independents" and major companies prepare to begin exploratory campaigns. Two wells are drilling—one by Gilliland, and the other by Istanbul Tabilii.

TABLE III—FREE WORLD CRUDE-OIL PRODUCTION
(Thousands of Barrels Per Day)

	1955	1960	1965	% Change 1955-65
United States	7,495	8,870	9,870	+ 31.7
Other non-communist countries	6,830	9,780	14,680	+114.9
Total	14,325	18,650	24,550	+ 71.4

Exploratory interest in Pakistan has heightened, and in 1956 wells were begun by Hunt Oil Co., Standard Vacuum, and Pakistan Oilfields. The Hunt well apparently was off-structure, and the rig was moved a few miles to spud in again. Stanvac was still drilling at the year's end. Pakistan Oilfields made a second major gas strike during the year, adding substantial reserves to the Sui field which has been connected with a large gas pipeline to Karachi. The line will extend to Multan and other major cities of Pakistan.

India announced a substantial government program, with Russian experts to aid her. Standard Vacuum is the only major private concessionaire in the country, and recently announced plans for a well during 1957.

Little activity, other than progressive development, has been reported in Indonesia, where concessionaires are restricted to their present acreage. No discoveries have resulted in Papua, nor in New Guinea—except some gas wells which gave considerable blowout trouble to Australasian Pty., in Papua, in 1956. The only discovery since the end of World War II in British Borneo, viz., Jerudong, has been producing small but increasing amounts during the past several months. In Australia the hunt was nearly at a standstill following three years of one dry well after another. None of the wells fulfilled the promise which apparently had been held out by the first Rough Range well which West Australian Pty. Ltd. discovered.

Based on reports for the first half of the year, as compiled by the Society of Exploration Geophysicists, geophysical activity declined during the first half of 1956 by approximately 2%, to an average of 1,098 geophysical crews (including all types) from about 1,119 crews in 1955. Seismic work declined about 1.2%, gravity 7.6%, and magnetic 6.6%. The principal decline was in the Western Hemisphere, especially in the United States, where slight declines in activity affect the world percentage heavily. Seismic work in the USA declined about 5.6%, and the number of party-months declined to 4,590, while gravity work declined to 621 party-months. The share of the United States had declined steadily in recent years, in comparison with the world total—dropping to 63.2%, or 1.2% below 1955. The Western Hemisphere dropped about 3.7% during the first half of 1956 because of the decline in the USA and in Canada; the latter was off 2.6%.

In the Eastern Hemisphere increases were shown, although the total of seismic work represents only 836 gravity party-months as compared with 4,590 in the Western Hemisphere. Activity in the Eastern Hemisphere was up 15.4% during the first half of 1956, including an increase of 34.5% in gravity work. The largest rate of increase was in Europe, especially in France and Italy.

Production

World production of crude oil rose about 7% during 1956, to 16,520,000 b/d. The largest proportion of this increase was in the Middle East, followed by South America.

At the year's end, the pattern of world crude production changed abruptly. The Suez crisis brought USA production up to the levels indicated in the accompanying tables, while production in the Middle East fell by about 1,000,000 b/d in the last 2 months of 1956. Lack of tankers to replace Iraq Petroleum Co.'s pipelines and to supply Europe forced the Middle Eastern decline.

Estimates of crude-oil production levels through 1965 indicate that world production levels, excluding Russia and the other communist countries, will rise to about 18,650,000 b/d in 1960 and to around 24,550,000 b/d in 1965. The largest proportion of this increase is estimated to come from nations outside the United States, where production will rise about 114.9% over the 1955-56 period. USA production in this same period is estimated to rise only 31.7%. The sharpest rise is estimated to occur in the Middle East, where production will rise from around 3,240,000 b/d in 1955 to around 8,280,000 b/d in 1965. Canada is estimated to reach about a million barrels during the same period; Venezuela to reach more than 3 million barrels daily; and Mexico to reach about 550,000 b/d.

The estimated capital expenditure necessary to sustain this volume of production, and to meet the refining and consuming needs which accompany it, have been given by The Chase Manhattan Bank at $115 billion over the 1955-through-1965 period, based on dollars of the 1955 value. Of this total, $73.5 billion will be necessary for development within the United States and $41.5 billion in the remainder of the non-communist world. Within the USA, the division of these expenditures during 1956-60 will be 71% for exploration and production, 13% for refining, and 16% for other facilities. The pattern of expenditure is sharply different in the remainder of the non-communist world—where 36% is estimated to go for exploration and production, 21% for refining, and 43% for other facilities. Expenditures for similar categories in the 1960-65 period are estimated to be 68%, 16%, and 16% in the USA, and 40%, 21%, and 39% in the other non-communist world, respectively.

TABLE IV—NON-COMMUNIST OIL DEMAND
(Thousands of Barrels Per Day*)

	1955	1960	1965	% Change 1955-65
United States	8,380	10,300	12,800	+ 52.7
Other non-communist countries	5,900	8,400	12,000	+103.4
Total	14,280	18,700	24,800	+ 73.7

*Based on 4.3% annual increase compounded in USA and 7.3% annual increase compounded in other non-communist countries.

Refining

World refining capacity has shown a steady upward rise since the end of World War II, and the rise continued into 1956. The total world refining capacity as of mid-1956 was 18,048,525 bbl per calendar day of crude throughput capacity, of which 7,853,265 b/d was cracking capacity. Expenditures for refining are estimated to continue to rise—with expenditures during 1956 totaling about $1.5 billion. In 1957 expenditures are estimated at around $1.6 billion in the non-communist world—rising to $1.8 billion in 1958, declining slightly to $1.675 billion in 1959, and rising again to about $1.9 billion in 1960.

Growth in Demand

Consumption in all countries during 1956 is estimated at 17,295,000 b/d of crude equivalent, equal to about 16,084,000 b/d of actual consumption. This is an increase of around 7.7% over 1955. Consumption rates vary widely between the Western and Eastern Hemispheres—rising to about 10,885,000 b/d of crude equivalent in the West and to 6,410,000 b/d in the Eastern Hemisphere. This represents an increase of around 10.8% in the Eastern Hemisphere, and only 5.8% in the Western.

Various estimates of future world consumption have been made. The rate of annual growth in demand in the United States over the 1932-55 period approximated 5.8% compounded. The growth in the remainder of the non-communist world in the meantime approximated 11% per annum, compounded over the 1942-55 period. Based on a continuation in these rates of growth, United States demand will approximate 11,110,000 b/d in 1960 and 14,730,000 b/d in 1965. The remainder of the non-communist world will approximate 9,940,000 b/d in 1960 and 16,750,000 b/d in 1965. Combined, the two will reach 21,050,000 b/d in 1960 and 31,480,000 b/d in 1965.

Other estimates of growth in demand may be assumed. A slightly lower growth rate, i.e., 4.3% yearly in the USA and 7.3% yearly in the remainder of the free foreign world, would approximate a 1965 demand of 24,800,000 b/d. It should be noted that most predictions in the past have proved to be too conservative.

OIL LAWS

There are four major legal systems governing oil development and production throughout the world. The first of these is the system found in the United States and Canada, under which the oil industry has been developed by a very large number of operators, both large and small. In the United States there are extensive private rights to the subsoil, whereas in Canada such rights are primarily the property of the government. However, this has not prevented

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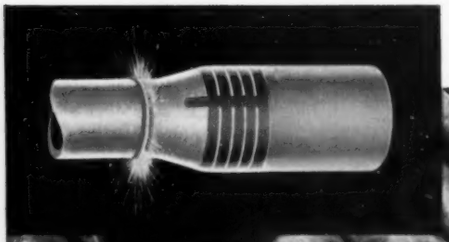

a similar pattern of development, particularly since both countries employ a distinctive method of financial encouragement to supply the very large sums necessary, viz., the depletion allowance and the expensing privileges. Both systems employ conservation and prorationing; these are not generally found outside the USA and Canada. And both grant relatively small parcels of land for exploration and development to any one company or individual.

Another unique feature of the North American system is the duration of the production phase, which both in Canada and the United States lasts so long as production in commercial amounts continues; whereas in other countries it is granted only for a specified period. The regulations governing methods used in drilling and production, and for the prevention of waste, also are more highly developed than in any other area.

A second system for regulation of oil exploration and development is complete or partial nationalization of the industry, such as is found in Mexico, Argentina, Brazil, Chile, the communist countries, and in some other countries in less complete form. Without exception, the demands for capital essential to a rapid growth of the oil industry have exceeded the amounts at the disposal of these countries which have nationalized oil, and they have fallen behind. Some, such as Mexico, have succeeded in building a sizeable industry, but all have fallen behind normal expectations and needs. Inadequate capital structure has been aggravated by political considerations, as in Mexico—where the artificially low internal price structure has held down the rate of capital formation, and has prevented adequate investment.

A third system is that found in the major producing countries of the Middle East. These countries have no mining nor oil laws. They are characterized by large concessions which have been concluded, for very long periods, between the oil companies concerned and the local rulers. Generally, these contracts are based on the 50-50 profit-sharing concept which originated in Venezuela. However, there are important differences between the various countries of the Middle East because some of them provide for division before foreign taxes, and some after. In addition, there are substantial differences in the method of calculation of the value of production. These differences have tended to iron themselves out, since all the concessions contain a clause stating that any more favorable conditions given to another Middle Eastern country must also be extended to the concessionary country. Furthermore, several of the countries have concluded agreements between themselves for the exchange of information on the details of concession arrangements.

The fourth major system is that found in the majority of South American countries; and it has been adopted, with substantial changes, in many other countries. This is the regulation of oil exploration and production by means of a single petroleum law (sometimes contained as part of the general mining law) which reserves subsoil rights to the nation but grants rights for their development to private enterprises composed either of foreign or local capital.

In recent years an increasing number of countries has adopted this system. They include most of the Central American and Caribbean countries, Guatemala being an example; some countries of Africa, such as Libya and Egypt; Middle Eastern countries, including Turkey, Israel and, to a modified degree, Syria; and countries of the Far East, such as Pakistan and the various states of Australia. Modification of the general mining law is generally used in

TABLE V

DOMESTIC CONSUMPTION OF MAJOR OIL PRODUCTS—1955

(Thousands of Barrels—US Bureau of Mines Figures)

Country	Motor Fuel	Kerosine	Distillate Fuel Oil	Residual Fuel Oil	Lubricating Oil	Total Major Products
NORTH AMERICA and CARIBBEAN						
Alaska and Hawaii	5,000	150	2,700	5,900	120	13,870
Canada	80,554	14,038	56,050	46,500	3,000	200,142
Central America	3,320	630	3,820	5,920	90	13,780
Cuba	5,701	861	2,274	10,164	220	19,220
Dominica	680	90	300	740	50	1,860
Haiti	310	30	210	100	4	654
Jamaica	541	136	539	1,910	19	3,145
Mexico	23,500	7,600	8,700	25,000	850	65,650
Puerto Rico	3,600	740	820	3,850	60	9,070
Trinidad	714	201	1,990	7,200	40	10,145
United States	1,321,730	116,815	581,351	557,423	42,480	2,619,799
TOTAL	1,445,650	141,291	658,754	664,707	46,933	2,957,335
SOUTH AMERICA						
Argentina	14,500	7,380	11,000	35,900	1,150	69,930
Bolivia	637	148	215	634	10	1,644
Brazil	23,932	4,559	10,352	24,538	1,360	64,741
Chile	3,390	1,320	1,710	6,300	170	12,890
Colombia	7,378	1,570	1,989	3,670	150	14,757
Ecuador	1,120	200	480	900	20	2,720
Paraguay	196	49	47	68	6	366
Peru	4,710	1,742	1,839	4,455	80	12,826
Uruguay	2,202	1,274	1,350	4,590	90	9,506
Venezuela	12,400	3,245	6,443	18,167	291	40,546
TOTAL	70,465	21,487	35,425	99,222	3,327	229,926
WESTERN EUROPE						
Belgium and Luxembourg	8,850	1,440	9,340	10,700	715	31,045
Denmark	5,487	485	5,530	10,430	340	22,272
Finland	3,050	545	2,451	2,551	185	8,782
France	38,500	800	25,115	58,050	3,129	125,594
Germany, West	26,357	395	26,750	23,616	3,416	80,534
Greece	2,000	772	2,600	5,100	140	10,612
Iceland	470	30	800	700	30	2,030
Ireland	3,170	900	1,100	2,600	140	7,910
Italy, Trieste	12,300	1,449	13,800	46,800	1,281	75,630
Netherlands	8,000	2,500	11,704	18,900	693	41,797
Norway	2,796	333	6,736	8,764	270	18,899
Portugal	1,237	1,110	2,742	3,449	157	8,695
Spain	4,800	1,050	4,900	10,500	550	21,800
Sweden	9,469	3,600	20,887	24,493	784	59,233
Switzerland	4,500	310	7,170	2,100	300	14,380
United Kingdom	58,100	10,870	35,600	75,200	6,300	186,070
TOTAL	189,086	26,589	177,225	303,953	18,430	715,283
MIDDLE EAST						
Bahrain	253	88	1,758	4,096	15	6,210
Iraq	1,370	1,450	1,690	4,100	70	8,680
Israel	1,600	2,200	1,400	5,100	100	10,400
Jordan	380	260	190	90	20	940
Kuwait	429	124	234	7,860	3	8,650
Saudi Arabia	1,186	250	2,100	9,660	20	13,216
Syria-Lebanon	2,200	1,200	3,500	2,800	90	9,790
Turkey	3,315	2,000	3,096	533	413	9,357
TOTAL	10,733	7,572	13,968	34,239	731	67,243
ASIA						
Burma	800	400	400	250	60	1,910
Ceylon	1,200	700	1,450	3,100	50	6,500
Formosa	1,000	500	800	1,400	70	3,770
India	8,600	11,200	6,580	6,500	1,000	33,880
Indo-China	2,500	450	650	750	70	4,420
Japan	16,600	3,160	9,000	38,000	2,550	69,310
Malaya	3,500	700	6,300	13,300	200	24,000
Pakistan	1,400	1,500	2,300	4,600	200	10,000
Thailand	2,100	650	1,600	1,000	150	5,500
TOTAL	37,700	19,260	29,080	68,900	4,350	159,290
AFRICA						
Algeria	2,500	560	2,600	5,300	170	11,130
Belgian Congo	1,700	200	1,000	70	150	3,120
Cameroons, French	450	100	150*	N.A.	30	730
Egypt	2,920	6,300	4,770	19,500	315	23,805
Ethiopia	400	40	60*	N.A.	40	540
Kenya	1,000	250	3,800*	N.A.	90	5,140
Liberia	100	30	40	—	5	175
Madagascar	450	90	170	30	40	780
Morocco, French	3,041	354	1,320	1,520	130	6,365
Nigeria	1,800	400	350	270	70	2,890
Rhodesia	1,680	290	600*	N.A.	120	2,690
Sudan	600	150	400	700	40	1,890
Tanganyika	500	200	650*	N.A.	30	1,380
Tunisia	770	275	800	1,300	50	3,195
Uganda	450	150	200*	N.A.	30	830
Union of South Africa	11,600	4,000	4,400	2,500	700	23,200
TOTAL	29,961	13,389	21,310	31,190	2,010	97,860
OCEANIA						
Australia	26,267	3,797	9,979	12,596	1,317	53,956
Indonesia	4,350	5,550	6,000	7,000	250	23,150
New Zealand	6,600	200	1,900	2,200	250	11,150
Philippine Islands	5,370	1,540	3,040	3,500	300	13,750
TOTAL	42,587	11,087	20,919	25,296	2,117	102,006
TOTAL ABOVE COUNTRIES	1,826,182	240,675	956,681	1,227,507	77,898	4,328,943
Daily Average	5,003	659	2,621	3,363	213	11,859

*Includes any residual fuel oil, quantities not available. N.A.—not available.

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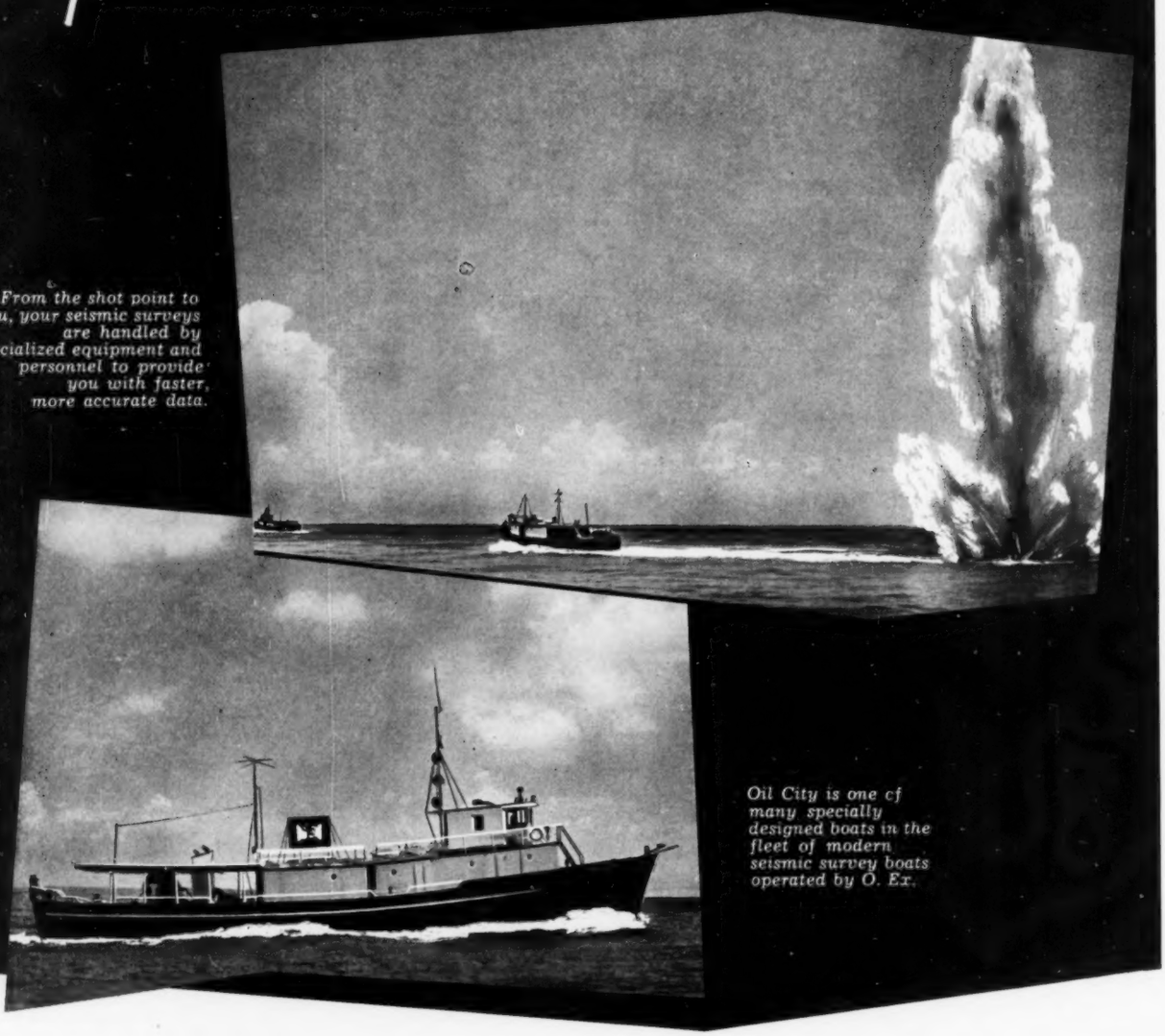

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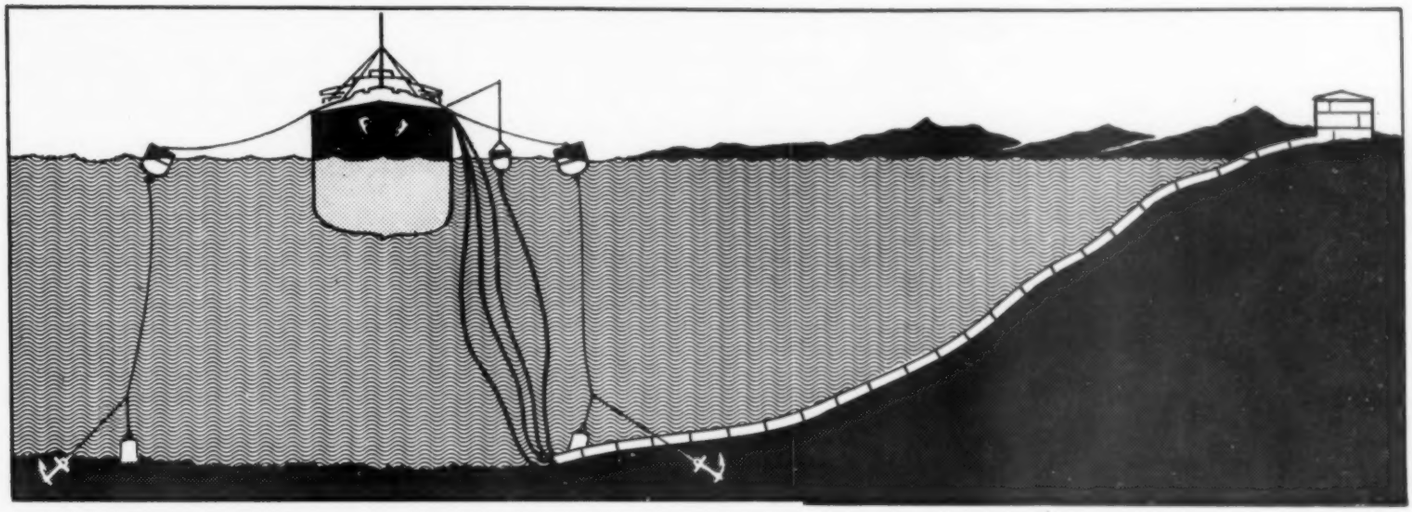

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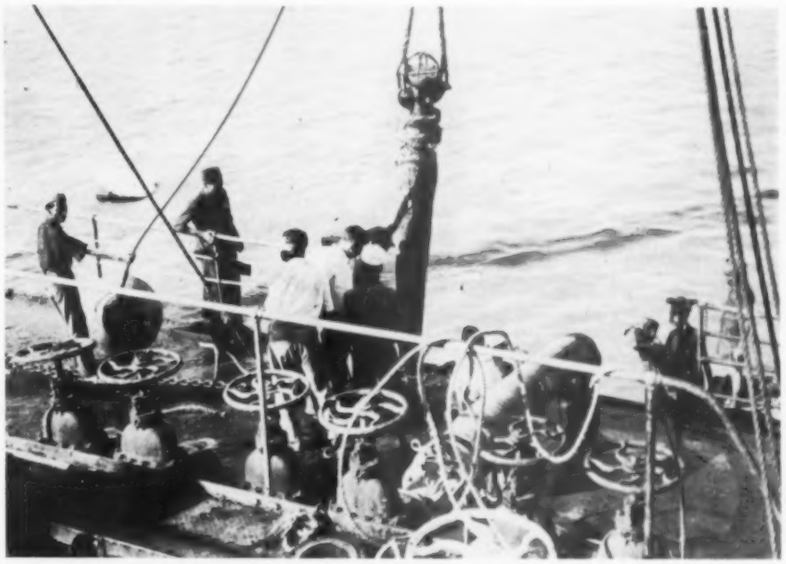
The "Tagelus" of London, T2 type 38,000 dwt tanker maneuvered into position for mooring to the Navy type buoys preparatory to bringing the submarine sea-loading hoses on board.



One of the sea-loading hoses being brought on deck. To the left on deck is the hose marker buoy and floating in the water is the marker buoy indicating the end of the sea-loading line.

COLLINS CONSTRUCTION COMPANY PORT LAVACA, TEXAS

Europe—as in France, Italy, and Spain—rather than a separate petroleum law.

Most of these laws divide operations into two phases, viz., exploration and exploitation. During the exploration period the duration of the concession initially is about three to five years, with provisions for extensions based on minimum expenditures and sometimes on drilling by the concessionaire. In the case of France, the extension is proportional to the investment; in most other countries extensions are granted if a minimum level has been reached. The concession area is unlimited only in France. In other countries, exploration areas are small compared with holdings in the major Middle Eastern producing countries, and a limit on the number of concessions per company is enforced. Many laws have eased provisions in areas difficult of access, as in the less accessible areas of Colombia or in the Montaña region of Peru where area limitations are more liberal.

An essential feature of the exploration phase is the guaranteed right of the exploration concessionaire to an exploitation concession covering any discovery he may make. This is essential in view of the large initial investment which is necessary to discover production.

During the exploitation phase, the concessionaire is often subject to the 50-50 profits' sharing arrangement. This originally was designed for such countries as Venezuela, where production has been established for more than a quarter century. It is an advanced concept in the petroleum law of a country which has not had established production, but is contained nevertheless in many of the recently-enacted laws. Generally, the division is accomplished by an income tax which is levied after previous taxes and authorized deductions have been taken from gross income. It absorbs remaining income to accomplish an equal division between company and government. Some countries (not including Venezuela) grant depletion allowances which reduce the impact of this provision—although in some countries, such as Libya, it does not take effect until a certain minimum production level has been achieved.

Extensions of the exploitation period—which generally runs from 30 to 50 years—are usually given subject to the "terms and conditions then in force." Often there is a prohibition against changes in important concession provisions during the life of the concession.

The area covered by the exploitation concession is generally in the neighborhood of one-half the exploration area. The selection of this one-half is left in part to the concessionaire; the remainder reverts to the government, which sometimes establishes "reserves" and regrants the area subject to competitive bidding therefor.

Royalty rates on production vary widely—from unspecified rates in countries such as Switzerland to 12½% in the United States, 16 2/3% in Venezuela, and up to 25% in Egypt. Many royalty rates vary with the distance of production sites from nearest marine terminal, as in Colombia and Argentina. Some vary with production rates, usually increasing as production rises.

An initial tax is levied on both exploration and exploitation concessions, and an annual surface tax is generally payable—with suitable guarantees against damage to be posted. Often the surface taxes are deductible from royalties paid during development.

An important aspect pertaining both to exploration and exploitation phases is the obligatory employment and training of nationals of the country in which operations take place. This requirement is found in many countries, and obliges the concessionaire's employment of a certain percentage of nationals in the labor force (usually 75% or more). Often there are certain social welfare obligations—including housing, medical care, etc.

A final series of important provisions are those relating to transfer of concession rights and the right of voluntary surrender. Generally, concessionaires are given the right to surrender all or part of their concession area, provided concession obligations have been met. Transfer of rights is generally subject to government approval, which is forthcoming only if the transferee meets specified minimum qualifications, and if the transfer does not increase his areas already held to more than the maximums specified in the law.

NATIONAL FACTORS

The attitude of the various governments toward participation of private capital, foreign and domestic, in their local oil industry has undergone a significant change since the end of World War II.

Workable petroleum laws have been passed in Israel, Guatemala, Turkey, Pakistan, Canada, Panama, Bolivia, Libya, Egypt, the Philippines, Peru, Honduras, Iran (where the consortium was worked out after nationalization), and Sicily.

Countries wherein a workable law and/or concession arrangements have been maintained or improved include Venezuela, Colombia, France, England, The Netherlands, Spain (which in 1952 gave a substantial concession contract to an American company, overcoming previous limitations on foreign ownership), Australia, New Guinea, Papua, Switzerland, Iraq, Kuwait, Saudi Arabia, Kuwait-Saudi Arabia Neutral Zone, and the Trucial Coast (including Muscat and Oman).

The number of countries with favorable governmental attitudes and laws far outweighs the number which have moved in the opposite direction. No major producing countries have joined permanently the ranks of the nationalized countries since the end of World War II. Indonesia still permits substantial private operation on areas held before the war, although Shell's producing properties have not yet been returned (a new law is now being drafted after extensive consultation with various other governments, such as that of Venezuela). Iran, after a brief experiment with nationalization, has returned much of her area to the consortium. Established monoplies in Agentina, Mexico, Brazil, and Chile have remained nationalized—although Argentina and Chile may soon relax their hold. Egypt, however, recently nationalized oil holdings by French and British interests.

Monopolies remain in Afghanistan, the communist countries, and in India—where the government has expressed its determination to take over the industry. Italy has retained its hold over the Po valley, but permits exploration by private enterprises throughout the remainder of peninsular Italy. In Syria a workable law is overshadowed by restrictive ownership requirements.

The trend toward increased governmental participation has continued—with new arrangements in Pakistan, India, Burma, and France indicative of the tendency. Many petroleum laws and concession arrangements—such as the petroleum law of Peru, which provides for offering of 30% of stock of exploring companies to Peruvian citizens, and the obligation in Saudi Arabia to offer 20% of stock in newly formed companies—call for increased governmental participation. END

REPRESENTATIVE WORLD OIL PRICES
(January 11, 1957)

	CRUDE	
	API Gravity	Price (Dollars Per Barrel)
United States		
Oklahoma	36-36.9	$3.17
West Texas	29-29.9	2.80
Bradford (Pa.)	45	4.68
Signal Hill	27-27.9	2.92
Venezuela		
San Joaquin (f.o.b. Pt. la Cruz)	41-41.9	3.04
Tia Juana (Heavy, f.o.b. La Salina)	18.5-18.9	2.08
Middle East		
Saudi Arabia (ex Ras Tanura)	36-36.9	1.97
Iraq-Kirkuk (ex Banias)	36-36.9	2.69
Iran-Light (ex Abadan)	34-34.9	1.86
Saudi Arabia (ex Sidon)	36-36.9	2.69
Iraq-Basrah (ex Fao)	36-36.9	1.85
Iran-heavy (ex Abadan)	31-31.9	1.67
Far East		
British Borneo (ex Lutong)	37-38	2.60

PRODUCTS (f.o.b. bulk)
(USA Cents Per Gallon)

	Aviation Gasoline (100-130 Octane)	Kerosine (41-43 Water-white)	Diesel and Gas Oil (Diesel Index 53-57)
Netherlands West Indies			
(ex Aruba)	17.50	10.50	10.25
Singapore			
(ex P. Bukom)	18.375	10.875	11.00
Indonesia			
(ex Sugei)	18.00	10.50	10.375

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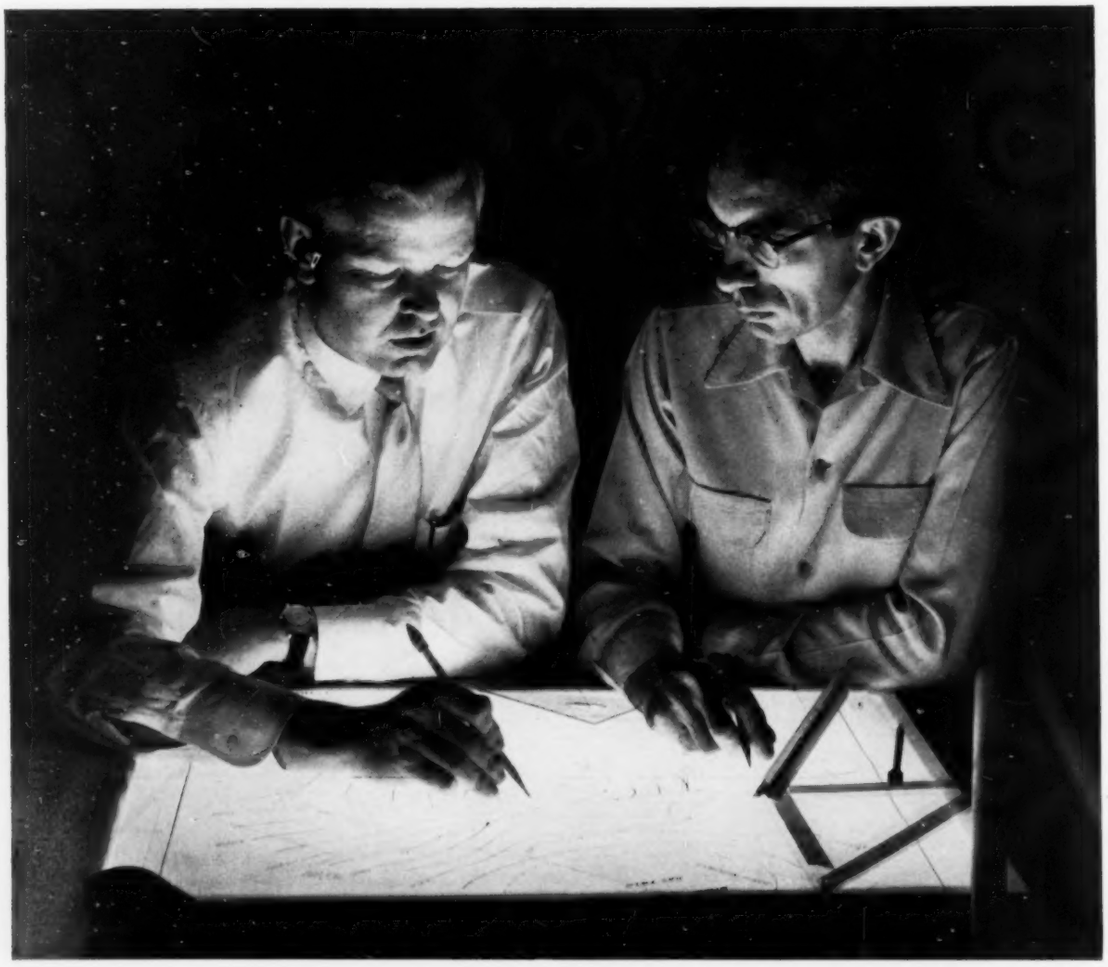

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These Package Sets are available in seven sizes and cover outputs from 128 to 800 shaft (continuous) horse power. The standard set incorporates hydraulic coupling transmission but torque converter transmission is also available.

Years of oilfield experience in all parts of the world are embodied in the design of the Paxman Package Set thereby resulting in all possible aspects being covered, namely:—

(a) Proven reliability throughout the world on draw-works and mud pump drive.

(b) Basic constructional simplicity resulting in the expenditure of minimum maintenance time.

(c) Interchangeability of 70% of the wearing parts provides for the minimum spares stocking.

(d) Fully self-contained power packs, easily manhandled and transportable.

(e) Full use is made of the Unified and A.P.I. screw and pipe threads respectively.

TABLE OF HORSEPOWER RATINGS *for sets fitted with fluid couplings*

ENGINE TYPE	NO. OF CYLINDERS	TOTAL DISPLACEMENT (CU. IN.)	BORE & STROKE (IN.)	MAX. TORQUE (LB. FT.) AT OUTPUT SHAFT SPEED (R.P.M.)	CONTINUOUS SHAFT HORSE POWER AT VARIOUS SPEEDS			
					900 R.P.M.	1000 R.P.M.	1100 R.P.M.	1200 R.P.M.
4RPH	4	1192	7 × 7½	640 @ 750	100	110	120	128
6RPH	6	1788	7 × 7½	960 @ 750	150	166	183	200
8RPH	8	2384	7 × 7½	1280 @ 750	200	222	243	265
12RPH	12	3576	7 × 7¾	1920 @ 750	300	333	367	400
16RPH	16	4768	7 × 7¾	2560 @ 750	400	444	490	533
12YHX	12	3576	7 × 7¾	2840 @ 700	450	500	550	600
16YHX	16	4768	7 × 7¾	3785 @ 700	600	667	733	800

NOTE: (i) The shaft horse powers quoted are the outputs continuously available at the output coupling after deducting all power absorbed by the radiator fan, water pumps, and transmission at any site.
(ii) This table applies to Package Sets equipped with hydraulic couplings.
(iii) "X" denotes engines pressure charged by means of exhaust gas driven turbo blowers.

(f) Plastic dipped spares for unlimited storage duration.

(g) Continuous after sales field service by factory-trained personnel.

The Paxman diesel engine is so designed that, wherever possible, wearing parts can be examined, adjusted or replaced without dismantling other portions of the engine unaffected by the particular operation. In our works ample stocks are maintained by an independent spares supply system to ensure that parts are instantly available as and when required. The level of stocks held is regulated by the total number of units in operation throughout the world, coupled with a close approximation of the "wear factor."

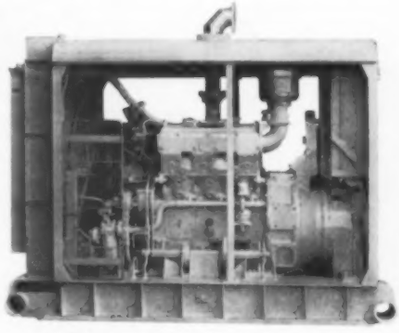
SERVICE

Whilst much has been done in the design of the Paxman engine to obviate the necessity for renewing parts, the life of any engine must depend, to a large extent, on the quality of the maintenance received at site. Every effort is made to meet all foreseeable contingencies but it will be appreciated that for really effective maintenance, a high standard of efficiency is essential from the operational staff on site. Full technical information is provided for this purpose and instructional facilities are available at Colchester and operatives are encouraged to make use of them.

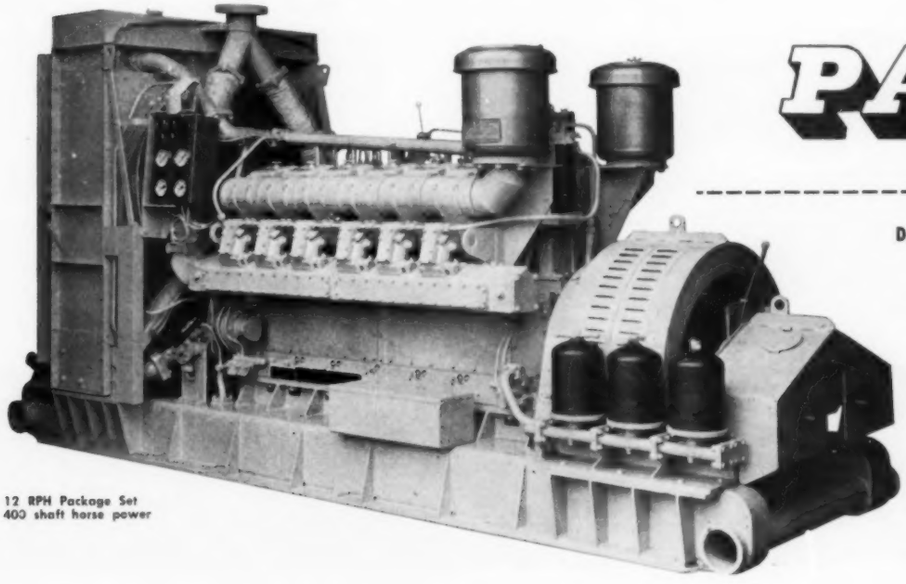
Paxman engineers are continually visiting the various oilfields, not only to advise operators if necessary but also to increase the Company's knowledge of operating conditions.

TORQUE CONVERTER SETS

We are first in offering as a *matched* unit an all-British Diesel/Torque Converter Power Pack. Each engine in our 7 in. bore range has been carefully *matched* to the correct type of converter, so that a wide range of torque outputs is available with the fewest possible types of torque converter. The components in both engines and torque converters are therefore to a large degree interchangeable. Brockhouse torque converters are currently available as single stage units having a maximum torque multiplication of 3:1; they incorporate their own integral oil cooling systems with fan-cooled radiators.



6RPH Package Unit fitted with a Torque Converter.



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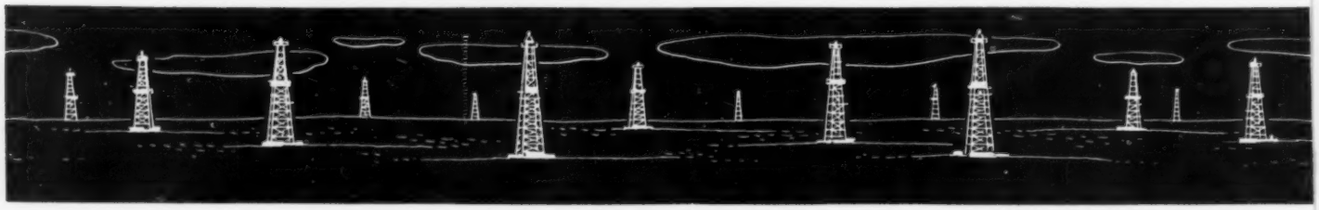

...Emulsion Drilling Fluid saves bits

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The first job on which Larco used TRIMULSO convinced Larco Drilling Company that this high speed drilling fluid can cut days off drilling time, reduce maintenance on mud pumps and mud lines, save bits and increase mud flow rates.

Larco proved these results when drilling Mashburn Vaughn Unit #1, in the Bolton Field, Hinds County, Mississippi, on their own lease. They were able to drill faster than the fastest hole previously drilled in this field. Their crews liked the way that they could control mud properties.

View of drilling rig and mud equipment at Larco Drilling Co.'s Rig #4 on Mashburn Vaughn Unit #1, Bolton, Mississippi. Inset is Mr. Jack E. Williams, Larco's drilling superintendent.

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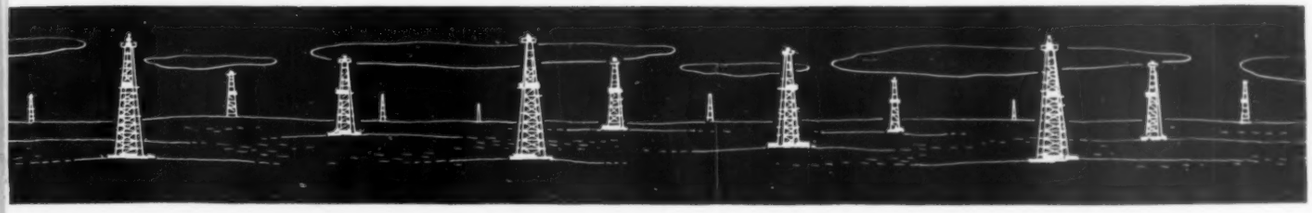

ADEN

Aden is composed of two parts. Aden Colony —with an area of about 75 square miles and a population of 140,000—is where the big Aden refinery is located. Aden Protectorate—with an area of 112,000 square miles and a population of about 650,000—is divided into the eastern and western areas, comprising a large number of sultanates and tribes bound by treaty relations with the British. Western Aden Protectorate is administered by a British agent stationed in Aden. Since 1954 it has been composed of a federation of states by agreement between local rulers. Eastern Aden Protectorate is administered by a British agent stationed at Mukalla. Aden Colony is administered by a governor, with a legislative council.

Exploration

The British Petroleum Co. obtained a concession, September 27, 1955, covering the Kamaran Islands in the Red Sea—a total of about 334 square sea-miles. Geological work has been carried out; and the German company, Prakla Gesellschaft, carried out a magnetic gravity survey during March and April of 1956. No further work has been planned.

Aden Protectorate is held under exploration concession by the Iraq Petroleum Co. Exploration was carried on before and after World War II—with no wells drilled as yet. Early in 1953 exploration flights were carried out over the eastern and northeastern parts, and geological surveys now are under way.

The Aden Protectorate is an uplifted area forming a fringe of the Arabian peninsula, deeply sedimented and sloping inwards toward the center of Arabia. It terminates on the south by a faulting system related to the depression which forms the Gulf of Aden. It contains heavy sediments, with oil-bearing possibilities, terminated by a complex of widespread vulcanicity on the southern rim.

Refining and Marketing

The Aden refinery of British Petroleum Co. came onstream during July of 1954 after 21 months of construction costing around $134.4 million. Capacity is 120,000 b/d. The refinery was designed to operate on crude from Kuwait —where British Petroleum participates in half of the sheikdom's production—with about four tankers weekly coming into the port of Little Aden, the refinery site opposite Aden town.

The refinery has a 12,000 b/d catalytic reforming capacity. A thermal reformer currently is under construction, to be completed in 1958. There are 2 distillation units, each with a capacity of 60,000 b/d. A sulfur-dioxide plant treats kerosine from the refinery with liquid sulfur dioxide to improve its burning quality. There is also an autofining process, with a capacity of 3,000 b/d, designed for sulfur removal.

A platformer of 12,000 b/d capacity, with a 10,000-ton-per-year LPGas plant, completes the refinery's equipment. The refinery is designed to produce about 3.5 million tons yearly of marine bunker oils; 100,000 tons of gas oil; 400,000 tons of jet fuel, kerosine, and vaporizing oil; and about 800,000 tons yearly of motor gasoline. The principal markets served by the refinery are ships' bunkers (Aden long has been a principal bunkering port), the Red Sea and the Indian Ocean areas.

Throughput of the Aden refinery during the first 10 months of 1956 was 9,030,000 tons (about 63,210,000 bbl).

Aden has been an important port since before Roman times, situated as it is on the main ocean route between Egypt and India. Its function as an oil port has been mainly to receive shipments from Kuwait and export products from the refinery. It has been a convenient stopping point for the supertankers which could not go through the Suez Canal fully loaded. They could leave part of their cargo at Aden, go through the canal, and fill up again at Mediterranean pipeline terminals to complete the voyage.

Since closure of the Suez Canal the economic situation of the colony has been affected seriously. During the month of October 1956, 422 ships were handled at the port—48 less than the monthly average. Since closure of the canal the number has dwindled to a small fraction of normal traffic.

NATIONAL FACTORS

The unit of currency in Aden is the East African shilling, which is on a par with the British shilling.

Petroleum regulation is through the Ordinances of Aden, Chapter 96, Mineral Oil Mining, dated October 4, 1937. The law is only five paragraphs long. It provides that no person may "prospect, explore, search, mine for or win" any mineral oil in the colony, whether on public or private land, without the governor's permission. The governor may attach such terms and conditions as he may think fit to any such written permit. Any person violating the provisions of the ordinance is liable to a fine not exceeding three thousand shillings, and an additional fine not exceeding one thousand five hundred shillings for each day the violation continues. END

BP BUILDS AT ADEN

To MEET the growing demand for oil, BP has brought new industry to the shipping port of call at Aden.

A great new oil refinery was erected in twenty-one months on the desert waste of Little Aden. This refinery is capable of handling one hundred thousand barrels of oil each day.

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ALASKA

Exploration

Extensive exploration has been done in Alaska, both by the US government and by private interests. Major acreage holders at present are as follows:

Shell	40,000
Richfield	150,000
Standard of California	250,000
General Petroleum	40,000
Union and Ohio (jointly)	254,000
Sunray Mid-Continent	128,500
Phillips Petroleum (Kenai Peninsula)	60,000
Phillips Petroleum (development contract)	1,063,884
Colorado Oil & Gas Co.	1,200,000
McGregar Land Co.	60,000

Colorado Oil & Gas Co. received a contract for exploration of 1.2 million acres in the Icy Bay-Cape Fairweather area of southern Alaska. The company began seismograph work and surface reconnaissance on June 1, 1956. A well is being drilled near Yakutat.

During 1955 a 626-mile pipeline was completed from Haines, on the coast of the Alaskan panhandle, to Fairbanks. Tankers can deliver to Haines the jet fuel, aviation and automotive gasolines, and diesel fuel needed to supply the big Air Force bases at Ladd, Eielson, and Camp Big Delta. The line has 12,000 b/d capacity, and only operates a limited time each month. William Bros. were the constructors.

The activities of the government in Alaskan exploration have centered around Naval Petroleum Reserve No. 4, an area of some 35,000 square miles just south of Point Barrow. This reserve was created in 1922, and work resulted in the discovery of 3 oil fields and 4 gas fields before suspension of operations in March 1953. The area and a surrounding 35,000 square miles are now being considered for opening to private interests.

Crude reserves of the government are estimated at 500,000 bbl and natural-gas reserves 231.7 billion to 233.7 billion cubic feet as of mid-1956.

Phillips Petroleum was the first company to be awarded a development contract, and is the only major operator in 1956 actually to put down hole. On the 1,063,884-acre block in the Katalla-Yakataga district which it was awarded under the development contract in 1953, Phillips bottomed its second hole in June 1955 at 10,013 ft. No commercial oil was recovered, although oil sands were encountered and samples from them were of high-quality crude. The hole was plugged and abandoned in December after a long series of tests. A third location, 1,200 ft south of the second hole, has reported shows and is below 10,000 ft. The first was a stratigraphic test, abandoned as a dry hole in May 1954 at a total depth of 4,837 ft. Nine more exploratory wells are called for by the contract within 10 years, and Phillips already has met the condition of having spent more than $1,200,000 prior to June 30, 1956.

Texota Oil of Denver will test holdings in Koyukuk Basin soon, Richfield plans a test using a heavy rig to 8,000 ft on the Swanson river unit during 1957. Under its development contract, Standard can hold 250,000 acres out of a total of 750,000 acres in the southern Kenai peninsula. For this, it had to spend $150,000 during 1955 for exploration, and will have to spend $100,000 each year until the spudding date for the first well, set at July 1, 1959.

Production and Refining

There is no commercial petroleum production in Alaska at present. Before World War II the Katalla field produced about 155,000 bbl of high-grade crude before depletion. A small topping plant, built on the field, burned in 1933, and there has been no refining in Alaska since that year. Petroleum consumption is supplied from the West Coast of the United States—Standard Oil Co. of California and Union Oil Co. being the principal suppliers.

A refinery of 3,000 b/d capacity is planned at Haines, according to an announcement in October 1956, by Shamrock Petroleum Ltd. of Edmonton—construction to start during the fall.

OIL LAWS

Exploration and development operations in Alaska are governed by lease, granted by the US Secretary of the Interior. These leases are of two types, competitive and noncompetitive.

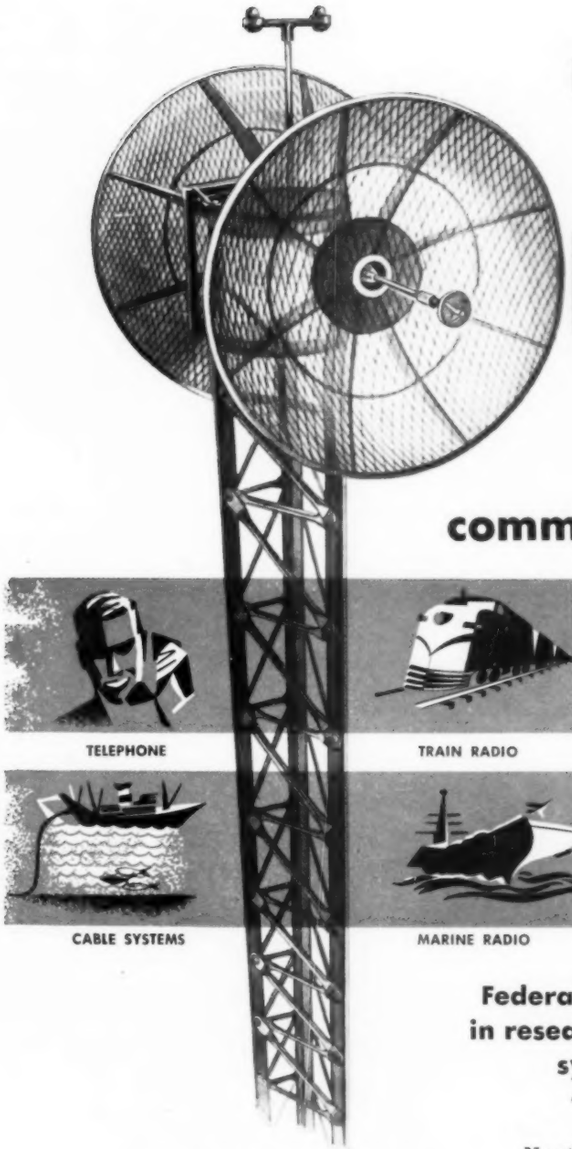
Noncompetitive leases are issued on areas other than known producing structures; duration is five years. If production is obtained, the lease continues for the duration of such production. Maximum area is 2,500 acres per lease, with a limitation of 100,000 acres (without special authorization) in leases to any person or corporation. Royalty is 5% for the first 10 years, thereafter 12½%. Annual rentals payable are 25 cents per acre, except that producing years are exempt from rental payments. A performance bond of $5,000 must be posted by the lessee. The right to surrender the lease when desired is guaranteed, if obligations thereof have been fulfilled.

Competitive leases are issued on lands within the geological structure of known producing fields or within one mile of a naval petroleum reserve. These leases are awarded in 640-acre units after competitive bidding, and carry a royalty of not under 12½% and an annual minimum rental of $1.00 per acre. A performance bond of $1,000 to $5,000 is required. Lessee may surrender his holdings, provided all obligations have been fulfilled.

Surface reconnaissance may be freely carried on under option, without license or lease, on open lands. The maximum area of such option, unless special permission of the Secretary of the Interior is obtained, is 200,000 acres.

NATIONAL FACTORS

The primary factor limiting Alaskan petroleum investment has been the combination of low economic development and population, with a difficult operating climate and an underdeveloped transportation system. The result has increased labor costs to nearly twice US levels and made Alaska a high-cost operating area. Drilling costs in the past have been nearly five times California levels. END



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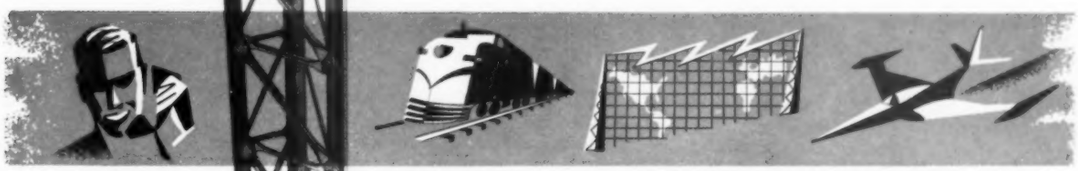

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ALGERIA

Exploration in Algeria has been much encouraged by recent oil and gas strikes in the vast sedimentary regions of the southern Sahara. The first of these occurred during late 1955, when Edjele No. 101, a wildcat well by Compagnie de Rechèrches et d'Exploitation de Pétrole au Sahara (CREPS), found oil and gas shows at 1,600 ft in clay and sandstone, gas shows at 2,156 ft, and produced about 500-670 b/d from 1,378 ft to 1,476 ft. Production was of 35 API crude, with a low sulfur content. The Edjele well was located only about 6 miles from the border of Libya and 280 miles east of Fort Flatters. Four offset wells of about 1,300 b/d have been drilled. This was the first new discovery in Algeria since the Oued Gueterini field was found in 1949.

CREPS is owned 35% by the Shell group, the remainder by French government companies.

This discovery was followed by another at Tiguentourine, about 43 miles west of Edjele No. 101, which is now producing a reported 670 b/d of 35 API crude from the lower Visean sands of the Carboniferous at 1,709 ft to 1,757 ft.

During May 1956 oil shows were reported by Cie. Française de Prospection Sismique (CFBS), an affiliate of Seismograph Service Corp., of Tulsa, operating for BRP. The shows were at 984 ft in very compact carboniferous sandstone formation, found during exploratory work near Reggane, about 150 miles west of In Salah and 450 miles southwest of Edjele No. 101 at 26° 42'N, 0° 11'E. This, in turn, was followed by two recent discoveries. The first was about 47 miles southeast of the desert town of Ouargla. It is known as Hessi Messaoud, located about 16½ miles from Hessi el Hadjar, a dry hole drilled by SN REPAL to 11,899 ft in 1955. Hessi Messaud had over 340 ft of saturated quartzitic sandstone (Triassic) between 10,919 ft and 11,316 ft. A number of successful drill tests in this interval gave about 30 bbl per hour (about 720 b/d) through a $\frac{3}{8}$-in. choke with the tool open 56 min. French press sources described it as a 3,600 square-mile field, with seven billion barrels reserve. The well was drilled by SN REPAL and Cie. Française des Pétroles.

The second test was by Cie. Française des Pétroles (Algérie), which reported a discovery some 37 miles northeast of Berianne, with no details as yet available.

Footage drilled in the Algerian Sahara totaled 165,792 ft during the first 9 months of 1956, substantially above 1955 levels. Footage drilled in the northern part declined substantially, due partly to the current political outbreaks.

Production

The only producing area in Algeria is held by Société des Pétroles d'Aumale (SPA), created in 1948. The company's 15,616-acre exploitation concession is near Sidi Aissa, and the field is known as Oued Gueterini.

As of January 1, 1955, there were 160 wells in the field, and reserves were estimated by the operating company at approximately 4 million barrels. Production is of 38.9 API paraffin-base crude from the Eocene at 520 ft to 2,100 ft. Porosity is given by the producing company as 5% to 25%, and permeability very low. Cumulative production to January 1, 1956 was 2,079,474 bbl. There appears to be little chance of extension of this field. Production has been declining steadily from its peak in 1953.

Refining

Since there are only two very small refineries in Algeria, one at Oued Djenan and the other at Aumale, most of the production is exported to France for refining there in bond.

Marketing

Consumption in 1955 was roughly 29,760 b/d, an 8% increase over 1954. In 1956 it was expected to decline, due to political difficulties, by 10% to 15% according to Algerian sources. Operations of principal marketing companies supply about 10% of total revenues of the Algerian government. These revenues are derived partly from a metropolitan protection tax of 1.2 cents, Algerian local tax of 14.7 cents, and 9.1 cents ad valorem Algerian specific tax on regular gasoline sales.

OIL LAWS

The government regulatory agency for petroleum operations within Algeria is the Governor-General, who has authority for approval of exploration permits and other matters of primary importance. Exploitation concessions, however, may be granted in Algeria only by a State council's decree, upon recommendation of "Conseil Géneral des Mines." Below the Governor-General is the Chief of the Mining Service (Sérvice des Mines) at 14, Boulevard Baudin, Alger, Algeria, who supervises actual operations under the concession, using as an intermediary the Préfet of the Department.

Only domestic corporations may hold petroleum rights, which means that the operating company must be organized according to the requirements of French law. There is no restriction in law on foreign ownership of the stock of such companies. In practice, however, there is enforced government participation. Since Algeria is an integral part of France, oil laws governing operations are essentially the same as those of France. The new French codification of August 1956 does not apply to Algeria, however.

NATIONAL FACTORS

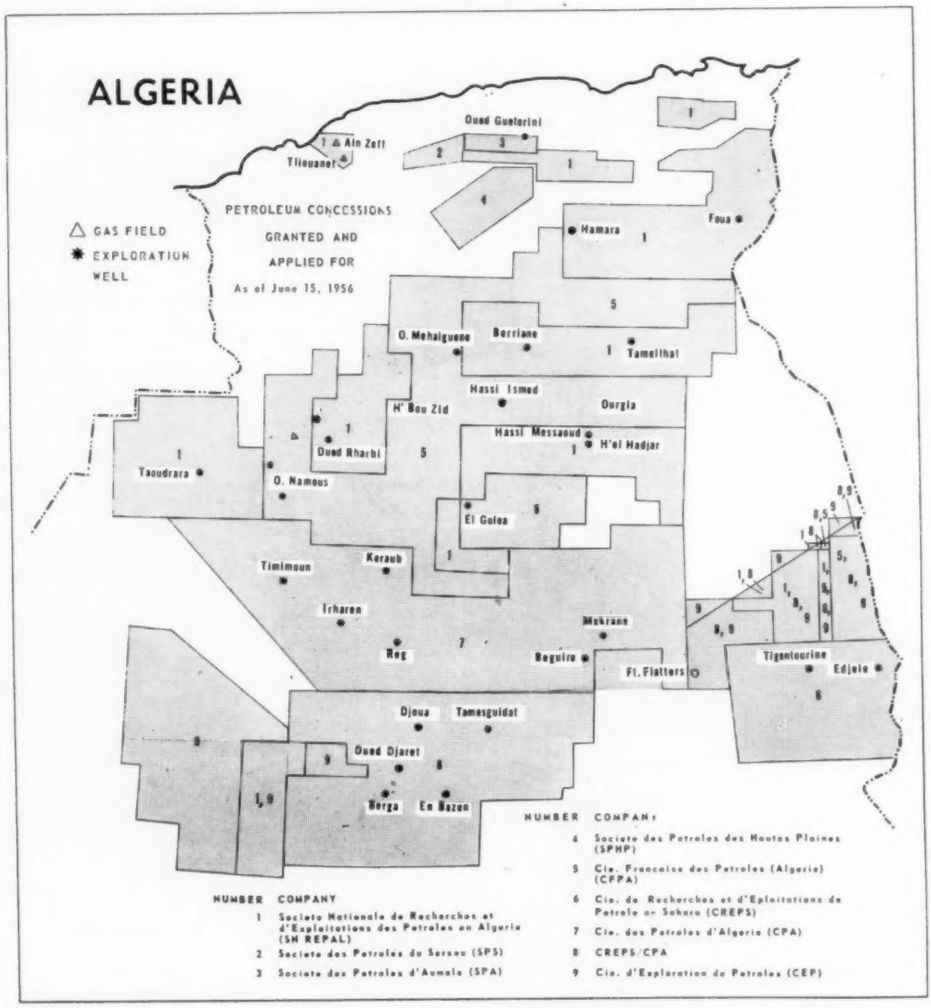
Investment in Algeria by private foreign sources has been hampered by the enforced government participation in exploring companies, combined with an extremely difficult and expensive operating area and political instability.

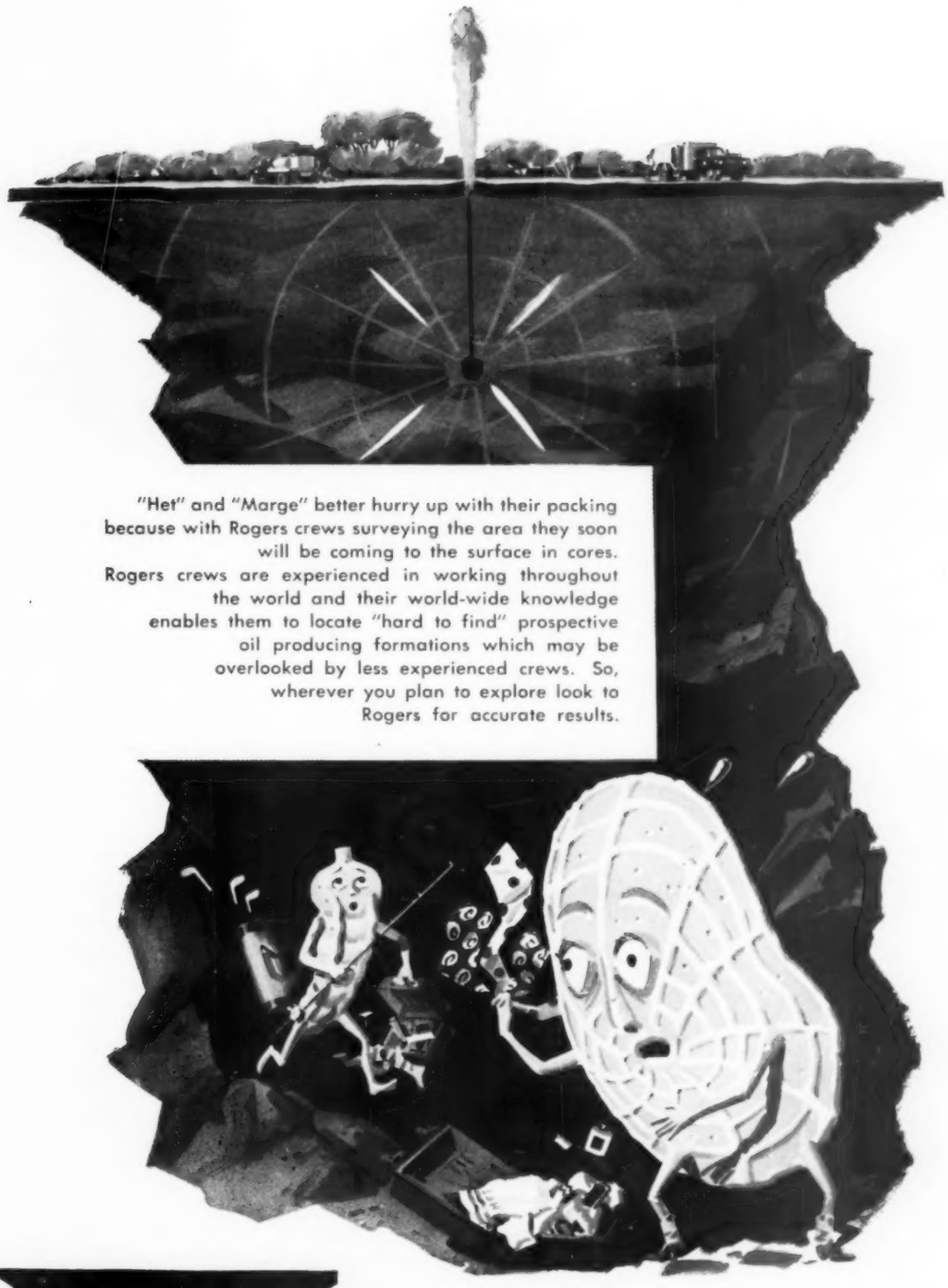
Investments in dollars since September 1, 1949 are given an unconditional guarantee of repatriation. Allocation of exchange for the remittance of profits—including dividends and interest, net operating income from business enterprises, and other periodical returns on investment—may be requested, and usually are granted, for profits up to 7% to 14% of capital.

END

Table I—ALGERIAN CRUDE PRODUCTION—1956
(Thousands of Barrels Per Day)

January	1.0	July	0.6
February	0.9	August	0.6
March	1.2	September	0.6
April	0.8	October	0.5
May	0.7	November	0.4
June	0.8*	December	0.5*
*Estimate		Year	0.7*





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ARGENTINA

Exploration

Exploration for oil in Argentina has been reserved, almost completely, for many years to Yacimientos Petroliferos Fiscales, a wholly owned Argentine-government company, known as YPF. Oil first was discovered, December 13, 1907, in the Comodoro Rivadavia area to the south. Private companies began wildcatting in 1910, and made their first discovery in the same area in 1916.

Esso SA Petrolera Argentina, a subsidiary of Standard Oil (N. J.), Cia. Diadema Argentina (Royal Dutch-Shell group), Astra Cia. Argentina de Petroleo SA (private Argentine capital), Cia. Ferrocarrilera e Petroleo (British capital), and Cia. Rio Atuel El Sosneado (private Argentine capital) began production in 1921. However, since the early 1920's private exploration has been restricted.

YPF has carried on exploration; and, during the period September 1, 1955 to August 30, 1956, 54 exploratory wells were drilled.

Reserves were estimated in July 1956 at 882 million barrels of crude oil and 1.8 trillion cubic feet of natural gas, for an increase of some 250 million barrels over 1955 estimates, and 630 million barrels over 1946 estimates.

There are four private producing companies in Argentina. Their share declined from 32% of total production in 1946 to about 16.2% in 1955 because of prohibitions against private exploration. Principal private producer is Diadema Argentina (owned by the Shell group), followed by Astra Cia. Argentina de Petroleo SA (financed with Argentine capital), Esso Productora de Petroleo (a Standard of New Jersey affiliate), Cia. Rio Atuel "El Sosneado" (financed with Argentine capital), and a second government company, Petroquimica, which was formed to take over the petroleum properties of the Cia. Ferrocarrilera de Petroleo, formerly owned by the British Railways of Argentina after they had been nationalized by the Peron administration.

Refining

There are 17 refineries in Argentina, with a total crude throughput capacity during mid-1956 of 201,350 b/d, of which 76,400 b/d is cracking capacity. Seven refineries, representing 70% of crude throughput capacity, are owned by the government through YPF.

YPF's reactivation plan includes an increase of 12.8 million barrels in refining capacity per year in its refineries and the new plant to be erected in the outskirts of Buenos Aires. This would bring total capacity of the country in 1960 to 226,027 b/d.

Crude runs to stills were about 37,741,383 bbl during the first 8 months of 1956; 20,095,783 bbl were from domestic fields and 19,032,814 bbl were imported from Peru, Ecuador, Venezuela, Russia, Middle East, and Bolivia.

Consumption of petroleum products during 1955 was 210,410 b/d. Including natural gas, consumption reached a total of 11.8 million tons of oil equivalent. Based on the reported figures for the first 8 months of 1956 and the present trend, an increase of nearly 6% in 1956 over 1955 consumption is estimated. Forecasts made by CEPAL (UN Economic Committee for Latin America), as well as estimates by other sources, bring 1960 oil consumption, including natural gas, to 16.8 million tons (about 336,000 b/d) and 1965 to 24.5 million tons (about 490,000 b/d).

Comparing the first 7 months of 1955 and 1956, Argentine petroleum imports increased 13.5% in 1956—to 4,606,587 metric tons. Crude imports increased from 272,692 tons in June to 451,671 tons in July. Between January-April 1956 imported fuel and lubricants cost Argentina 948,-800,000 pesos—more than 3 times 1955.

The successful completion of the YPF reactivation plan and the present policy of granting no more oil concessions to private companies will make YPF's production nearly 95% of the total, and its share of the local market may reach 77% in 1960 and 85% in 1965.

TABLE I

PETROLEUM PRODUCT PRICES IN ARGENTINA

PRODUCT	*1955 PRICE*	*1956 PRICE*
	(Pesos Per Liter)	
Gasoline	1.40	2.00
Kerosine	0.90	1.25
Gas oil	0.40	1.40
	(Pesos Per Ton)	
Diesel fuel (heavy distillates)	275.00	580.00
Residual fuel oil	220.00	480.00

TABLE III—REFINERIES IN ARGENTINA

(As of Mid-1956)

Company	Location	Crude Capacity	Cracking Capacity
Cia. General de Asfaltos	Wilde (BA)	370 L	——
Esso Refinadora de Petroleo SA	Campana (BA)	32,000 Comp.	11,000 T
	Bahia Blanca (BA)	5,500 CS	1,000 T
	Manuel Elordi (Salta)	1,700 S	——
	Dadin (P. Huincol)	500 S	——
Condor SA Petrolera Argentina	Lomas de Zamora (BA)	750 SL	——
Diadema Argentina SA de Petroleo	Buenos Aires [1]	21,000 Comp.	9,000 T
La Isaura	Bahia Blanca [2]	1,500 SC	1,000 T
Lottero, Papini, y Cia.	Avellaneda (BA)	630 SL	——
Ragor SAIC	Quilmes (BA)	300 SL	——
YPF	Dock-Sud Avellaneda (BA)	5,500 Comp.	3,000 T
	La Plata [3]	100,000 Comp.	25,000 TC
	San Lorenzo (Santa Fe)	17,000 SC	13,000 T
	Lujan de Cuyo (Mendoza)	11,900 SC	9,000 T
	Chachapoyas (Salta)	2,500 SC	1,300 T
	Plaza Huincul (Neuquen)	1,550 SC	1,100 T
Petroquimica (EN)	Comodoro Rivadavia	5,500 Comp.	2,000 T

(1) 3,000 b/d thermal reforming capacity.
(2) 2,000 b/d tube still plant under construction.
(3) 18,400 b/d fluid catalytic cracking capacity and 7,000 b/d thermal cracking capacity.
S—Skimming. L—Lubricating. C—Cracking. T—Thermal. Comp.—Complete.
Note: In column headed Cracking Capacity, C refers to catalytic cracking.

OIL LAWS

Subsoil rights, including petroleum, are reserved to the government in Argentina by the Constitution of 1853, and by Art. 373 of the General Mining Code. Legislation controlling petroleum exploitation includes the General Mining Code of November 25, 1886, effective May 1, 1887; Law No. 12161 concerning the legal régime of petroleum and fluid hydrocarbons, promulgated March 28, 1935; and Decree-Laws No. 12648 of 1943 and 22389 of 1945, creating National Direction of Energy. The General Mining Code applies to petroleum when not in conflict with the other laws cited, and Law No. 12161 forms Title XVII of the General Mining Code.

TABLE II

DRILLING IN ARGENTINA—FIRST 8 MONTHS 1956

Exploratory wells drilled: producers—	19
" " " dry—	19
Development wells drilled: producers—	144
" " " dry—	27
Footage drilled: exploratory—	180,000
" " development—	955,000
Rigs in service: exploratory—	18
" " " development—	50
Total wells drilled (cumulative to August 30, 1956)	9,320
Producing	3,385
Pumping	3,277
Flowing	108
Producing gas	284
Abandoned	2,369
To be abandoned	1,832
Dry	1,368

The oil-producing states (provinces), in a special congress held in July 1956, claimed ownership of their oil reservoirs which had been federalized by the 1949 constitution (abolished by the present government and replaced by that of 1853). In the same congress it was established that each province would keep for YPF (the federal government's oil company) its own oil reserves, and would enter into individual royalty agreements.

EXPLORATION: Exploration concessions have a maximum area of 2,000 hectares (about 5,000 acres) each, and only one exploration permit may be given within a radius of 5 km (about 3 miles) of an oil well previously in production. A total of 5 permits covering a maximum area of 30,000 hectares may be given one individual or company in "petroliferous" districts within 50 km of a producing well. Outside of this limit 10 permits may be held by one person or company, for a total of 60,000 hectares.

TABLE IV

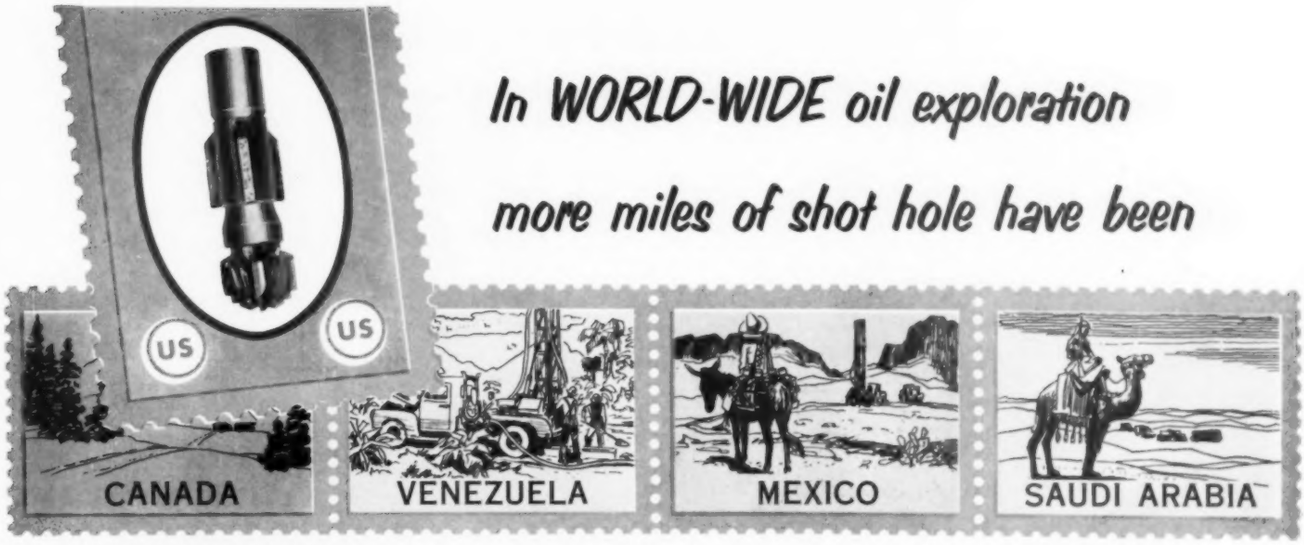
ARGENTINE CRUDE PRODUCTION—1956

(Thousands of Barrels Per Day)

January	84.5	July	80.2*
February	85.2	August	84.5
March	82.2	September	85.0
April	81.7	October	85.4
May	82.0*	November	85.6*
June	82.7*	December	86.0*
* Estimate.		Year	83.7*

Duration of exploration permits is three years, beginning six months following concession date. Two extensions may be given of one year each. A rig must be installed within 18 months.

An annual surface tax of one peso per hectare is imposed. On petroleum extracted during exploration, a royalty of 25% must be paid.



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EXPLOITATION: The discovery of petroleum gives the explorer the right to request "pertenencias" of 500 hectares maximum each from each exploration permit, up to one-half of the exploration area. These exploitation concessions must be square or rectangular in shape, with a minimum width of one kilometer and with the discovery well in the center. The number of exploitation concessions held by one person or company is not limited; however, the total of simultaneous holdings may not exceed 10,000 hectares. Duration of the exploitation concession is not specified.

Fiscal obligations of the concession include an annual surface tax of 10 pesos per hectare. A royalty of 12% is payable, which is reducible to 9% depending on characteristics of production, transportation, and distance. Any production before notice to the government is subject to 25% royalty. Royalties are payable in kind or in cash. If paid in kind, they must be transported at the same rate as the concessionaire's share. YPF is subject to the same taxes and royalty rates. No other levy—national, provincial, or municipal—is to be paid.

A minimum expenditure must be met of 50,000 pesos per pertenencia (500 hectares) over a 4-year period.

NATIONAL FACTORS

Aspects of Argentine investment favorability remain to be determined, as they are subject to change at present with the overthrow of the Peron and Lonardi administrations. The peso remains the unit of exchange, but the official exchange rate is now 18 per US dollar—with some imports, such as petroleum, subject to an 8% retention tax.

The main consideration, governmental attitude, is unclear at present; but the general tenor of the régime is very nationalistic, although the President has recently expressed his desire for foreign oil investment. END

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AUSTRALIA

Exploration has slowed to a standstill, following a series of dry exploratory wells. West Australian Petroleum Pty. Ltd. (WAPET) has conducted a very thorough search, after Rough Range No. 1, the discovery well, proved only a minor oil accumulation. It proved the oil-bearing possibilities of the discovery formation, however, in the Birdrong sand of Cretaceous age; and, after abandonment of the discovery at 14,602 ft, WAPET drilled 6 additional Rough Range tests, all of them dry.

Other companies have drilled a total of 15 dry holes, ranging from 3,200 ft to 10,000 ft in depth, in Queensland.

Santos Ltd., a small Australian prospecting company formed in 1954, has repeatedly found oil traces in its Wilkatana wells, near Port Augusta in South Australia. In this area a South Australian government geological survey has also recently come across similar oil traces. Santos to date has put down 13 core holes with light-fraction traces in several of them.

Production

The only producing field is the Lakes Entrance area, 200 miles east of Melbourne in Victoria. There are about 44 wells in the field, but production is down to less than 10 b/d. Work in horizontal drilling has been attempted without favorable results. A total of 16,896 bbl was produced from Rough Range No. 1 on tests in 1955.

Refining

Australian policy is aimed at building up sufficient capacity to supply local demand. Total refining during 1953 was only 20,821 b/d, but 1955 runs were 102,501 b/d due to the completion of new plants.

Marketing

Total demand for petroleum products has increased 175% since the end of World War II, and consumption per person has grown to 208 Imperial gallons from 94. Total domestic demand rose 19% in 1955, and local refining met 66% of such domestic demand, compared with 31% in 1954.

The increase in total consumption during 1955, to 151,624 b/d, continued during 1956 when demand rose to an estimated 159,960 b/d; 1960 consumption is estimated at 196,230 b/d.

Effort is made to direct petroleum import purchases to sterling sources; in past years they have run about 63% of imports from the Middle East, 22% from the East Indies, and 14% from the United States—the remainder from other sources. Imports during 1955 were up 33⅓%, to about 160,000 b/d, of which some 100,000 b/d were crude for local refining.

OIL LAWS

In Western Australia, the region of principal interest, exploration and development are governed by Petroleum Act No. 36 of 1936 and amendments thereto.

Exploration permit area is 1,000 square miles, with no limitation on the number of permits which may be held by one person or company. Filing fee is 100 pounds (US $224), plus a 1,000-pound bond for performance. The term of the permit is two years, renewable at successive one-year intervals. Rights of the permittee include exclusive exploration over the permit area and the right to surrender at any time.

The "license to prospect" is given to the holder of a previous permit who has fulfilled his obligations thereunder. The maximum license area is 200 square miles, with no limitation on the number of licenses which may be held by the same person or company. A performance bond of 1,000 pounds must be posted, and an annual tax is charged of 5 shillings per square mile (US $0.56), with a maximum tax of 12 pounds 10 shillings (US $27.90) for the first year. Thereafter 10 shillings (US $1.12) per square mile is charged per year, with a maximum of 25 pounds (US $56.) per year.

The duration of the license is four years. Two renewals are possible of one year each. Licensee is given the right to surrender at any time, with consent of the Minister.

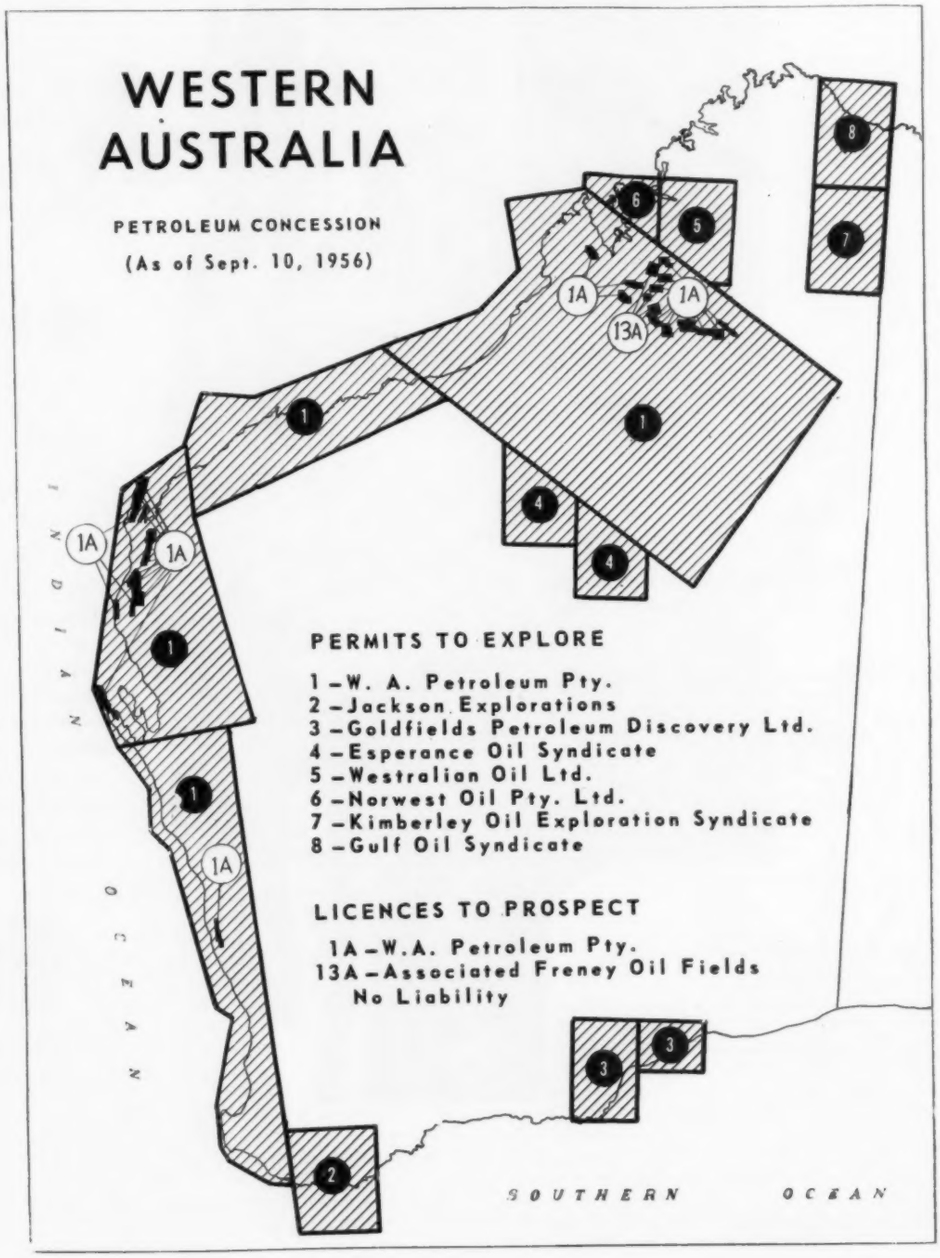
EXPLOITATION: The maximum lease area is 100 square miles, which is half of the license area, but in the event of the first commercial discovery in the state of Western Australia the licensee thereof has the right to a petroleum lease covering the entire area of the license.

Duration of the lease is 21 years, with renewals so long as oil is produced in paying quantities. Annual rental is 10 pounds (US $22.40) per square mile, with a performance bond posted of 1,000 pounds. Royalty may not be less than 5% nor more than 10% of production, as specified in the lease. The right of surrender is contained.

NATIONAL FACTORS

One of the factors tending to promote confidence in Australia as a site for private petroleum investment is the stability and attitude of the government. The attitude of federal and state governments is generally favorable to the development of petroleum by private capital, and there are no discriminatory restrictions on ownership by USA companies—although they must be domiciled in Australia to hold lease rights.

Taxation is relatively low. Income-tax levies on private companies reach a maximum of only 30%. (On undistributed income, however, the rates can go as high as 57%.) END


WESTERN AUSTRALIA
PETROLEUM CONCESSION
(As of Sept. 10, 1956)
INDIAN OCEAN
SOUTHERN OCEAN
PERMITS TO EXPLORE
1 – W. A. Petroleum Pty.
2 – Jackson Explorations
3 – Goldfields Petroleum Discovery Ltd.
4 – Esperance Oil Syndicate
5 – Westralian Oil Ltd.
6 – Norwest Oil Pty. Ltd.
7 – Kimberley Oil Exploration Syndicate
8 – Gulf Oil Syndicate
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AUSTRIA

The Austrian oil industry has only been returned to western control since August 13, 1955, as regards a large part of the most prolific producing areas, some refineries, and the promising exploration area of Lower Austria.

The principal private company exploring is Rohoel-Gewinnungs AG (RAG) which had one reflection-seismograph party in operation during 1955 and 1956, and has carried out some geological mapping in the Feldbach area of Styria. RAG is owned 50-50 by Socony Mobil Oil Co. and the Shell group.

RAG activities during 1956 were highlighted by discovery of 84 b/d of 34 API crude at 7,750 ft in a 6-ft section in Puchkirchen No. 1, an exploratory well which hit basement at 8,500 ft in Upper Austria. The offset well, Puchkirchen No. 2—2,400 ft north of No. 1—reached some 6,070 ft at the beginning of December 1956. Another wildcat was begun, October 19, at Geretsberg, south of Braunau at the German border—which had reached about 4,429 ft at the beginning of December 1956.

Another exploratory well in the Bad Hall area of Upper Austria reached the Upper Oligocene in the Molasse basin, at 2,967 ft, early in 1956. It was abandoned, as dry, after it had reached 7,372 ft in July 1956.

A 4-area concession was received by RAG, April 29, 1955, from the government—covering a total area of about 1,100,000 acres, of which 820,000 are in the provinces of Salzburg and Upper Austria—with 280,000 in Styria—in the southeastern promontories of the Austrian Alps.

As of May 1, 1956, a total of 15 concession applications over about 7,720 square miles had been received by the Federal Ministry from various companies.

The other principal private operator in Austria is the Van Sickle group, which has conducted drilling in Styria province. During 1955 it drilled 8,753 ft. One oil producer was completed, and one exploration well. The latter, Perbersdorf No. 1, reached 4,856 ft, with no shows of oil or gas.

The Austrian Oil Administration (OeMV) administers properties returned by the Soviets.

OeMV drilled 584,348 ft during 1955, compared with 612,833 ft total for Austria, including private companies. Drilling during the first half of 1956 was part of a $14 million modernization plan by the government to replace declining crude production levels caused by deterioration of the production equipment during the Soviet occupation. The largest share of the proposed expenditure ($5 million) went for 90 development wells, and $1.4 million went for 14 exploratory wells; $2.8 million went to refinery improvement, mostly liquid petroleum gas storage, and a pipeline from Bockfliess field to Korneuburg refinery; $2.6 million went for natural-gas facilities.

Production during the first half of 1956 declined about 5% to 64,736 b/d. Of this, 39% went to the USSR as reparations payment. Oil wells at mid-1956 totaled 710, plus 40 gas wells. During the first half of 1956, 85 wells were drilled, and an estimated 65 were added during the latter half.

Refining

There are seven refineries in Austria. The two oldest (Kagran and Floridsdorf) were built before World War I. The two latest (Moosbierbaum and Lobau) date back to 1938; whereas the other three were built in the period between. They have facilities for atmospheric distillation of crude (at a reported processing cost of 232 Austrian shillings per metric ton or $1.19 per barrel) and thermal cracking. Yields are about 5% gasoline (octane rating 56-65), 30% gas oil and kerosine, and 50% to 55% residues.

Consumption of petroleum products in 1955 and 1954 is given in Table I.

With the exception of kerosine, consumption of all standard petroleum products increased in 1955 by 12% to 33% over 1954. Total imports of products in 1955 were 381,014 metric tons (7,620 b/d), compared with 108,664 metric tons (2,173 b/d) in 1954. Exports in 1955 were 162,807 metric tons (3,256 b/d) compared with 1,927 b/d in 1954. No crude was imported. Crude exports were 12,229 tons (205 b/d).

A 33% increase in gasoline consumption during 1955 was due partly to the 30% increase in motor vehicles. The pump price of standard-grade gasoline was reduced, November 1955, to $0.457 per gallon. Domestic premium gasoline (octane rating, 84) was reduced in November 1955 to $0.531 per gallon. Despite the price cut, gasoline imports did not decline as expected because domestic gasoline with an octane rating of 72 to 76 costs exactly as much after the price reduction as the cheapest imported gasoline with an octane rating of 78 to 80.

NATIONAL FACTORS

The political situation has long retarded the development of Austrian petroleum. At the end of World War II Austrian fields were seized by the Russian occupation authorities as German assets. They were returned to Austria, but not to their original owners, by the State treaty of May 15, 1955 which terminated the Russian occupation of Austria. The price for their restoration (using 7 bbl per metric ton as a rough conversion factor) was 23,014 b/d during 6 years and 19,178 b/d during the following 4 years.

Some 26 concessions are included under the treaty, and may not be passed to foreign ownership. This does not exclude operations under contract to foreign oil companies, and it is likely this is what will happen when the political situation permits.

Operations at present outside the treaty zone are being conducted under the terms of the old "No. 375 Bitumen Law," which is a brief but satisfactory statute. It invests ownership of the subsoil in the Austrian State, and generally follows the terms of the German legislation.

The law calls for formation of an Austrian company for exploration. Exploratory rights are for an initial term of five years, with an unlimited number of three-year extensions given at the government's discretion. There is no specified maximum area for exploration permits.

The government is given wide powers of control over operations, including the right to specification of a minimum work program. Drilling obligations include one rig in operation during the permit duration.

Conversion to exploitation rights is not guaranteed, but the original exploration concessionaire is given preference over the area covered by his exploration right if he meets offers from other companies for the same area. The duration of exploitation concessions is 30 years, with right to one or more renewals, at the government's discretion, for 10 years each. On expiration of the exploitation term, the State is given the right to purchase installations within six months.

There is no limit on the area which may be covered by the exploitation concession. The work program is subject to government approval during development operations. A royalty of 6% is payable on gross production. END

TABLE I

AUSTRIAN CONSUMPTION
(Metric Tons)

	1955	1954
Gasoline	251,407	188,677
Special and test benzene	11,119	9,941
Kerosine	23,354	25,106
Gas oil and diesel oil	274,370	224,316
Fuel oil	945,676	746,249
Lubricating oils	72,540	63,309
Bitumen	47,308	39,106
Total	1,625,774	1,296,704
Total b/d (approx.)	32,515	25,934

TABLE II

AUSTRIAN CRUDE PRODUCTION—1956
(Thousands of Barrels Per Day)

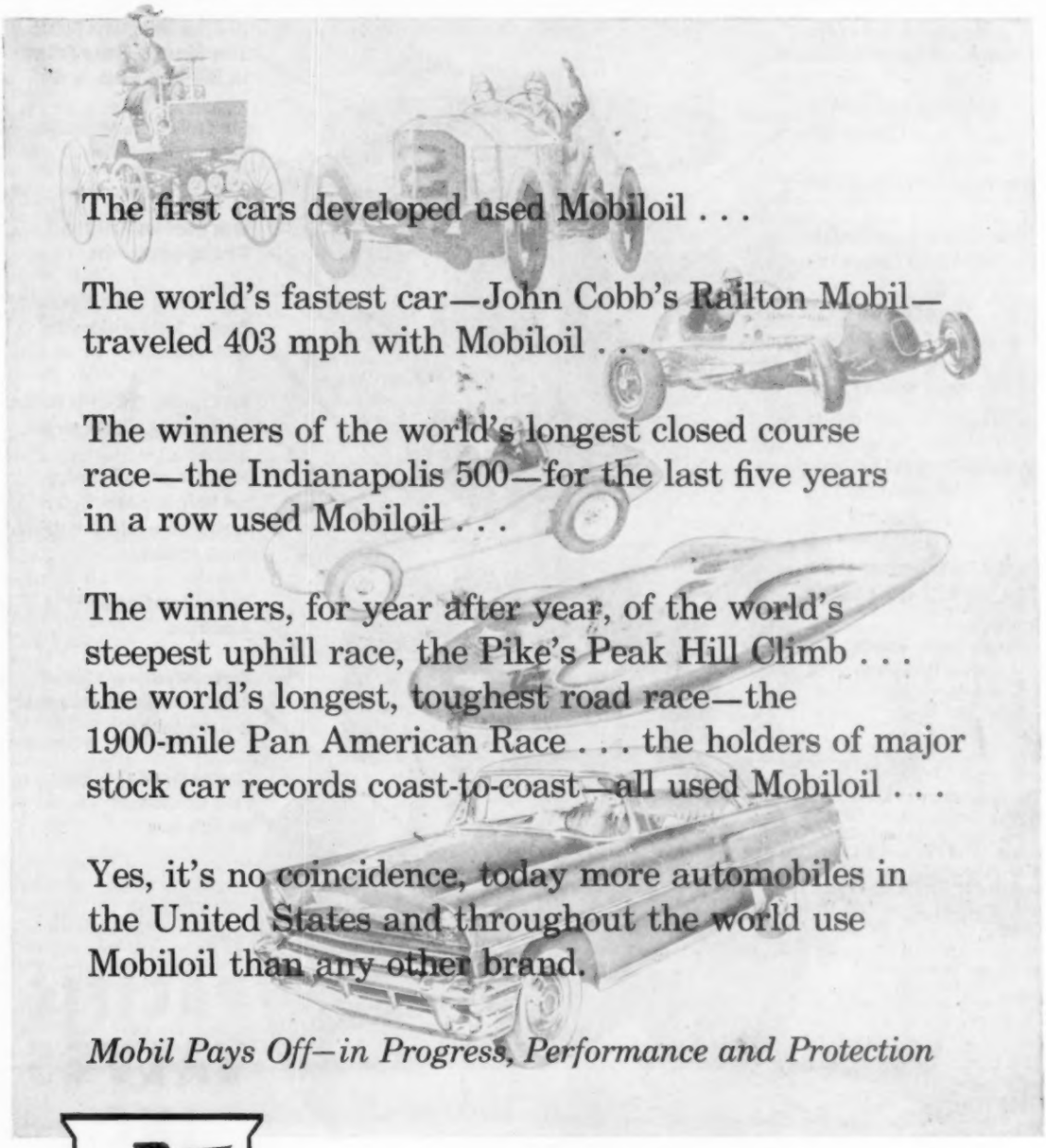
January	65.4	July	63.3
February	65.4*	August	63.0*
March	65.4	September	62.6
April	64.6	October	63.2
May	64.8	November	62.1*
June	63.8	December	62.2*
*Estimate		Year	63.8*

TABLE III

AUSTRIAN CRUDE-OIL PRODUCTION
(Metric Tons)

Field		Cumulative Through 1955	1955 Production
Muehlberg	OeMV	3,296,509	328,602
Alt-Lichtenwarth	OeMV	4,672	625
St. Ulrich-Hauskirchen-Niederdonau	OeMV	3,742,445	97,083
Neusiedl	OeMV	26,451	—
Maustrenk	OeMV	214,239	5,500
Windisch-Baumgarten	OeMV	588	—
Scharfeneck	OeMV	3,576	—
Hohenruppersdorf	OeMV	16,488	656
Rabensburg	OeMV	1,107	1,107
Matzen-Bockfliess-Prottes-Schoenkirchen	OeMV	11,273,421	873,143
Aderklaa	OeMV	1,349,715	175,406
Suessenbrunn	OeMV	19,786	1,232
Kreuzfeld-Pionier	EPG	16,492	1,247
Goesting	EPG	1,609,603	41,610
RAG	RAG	736,892	16,434
Geiselberg	RAG	2,432,910	88,741
Piatwald	van Sickle	54,770	4,731
van Sickle	van Sickle	1,073,950	29,995
Total		25,873,614	3,666,112

It's no Coincidence...



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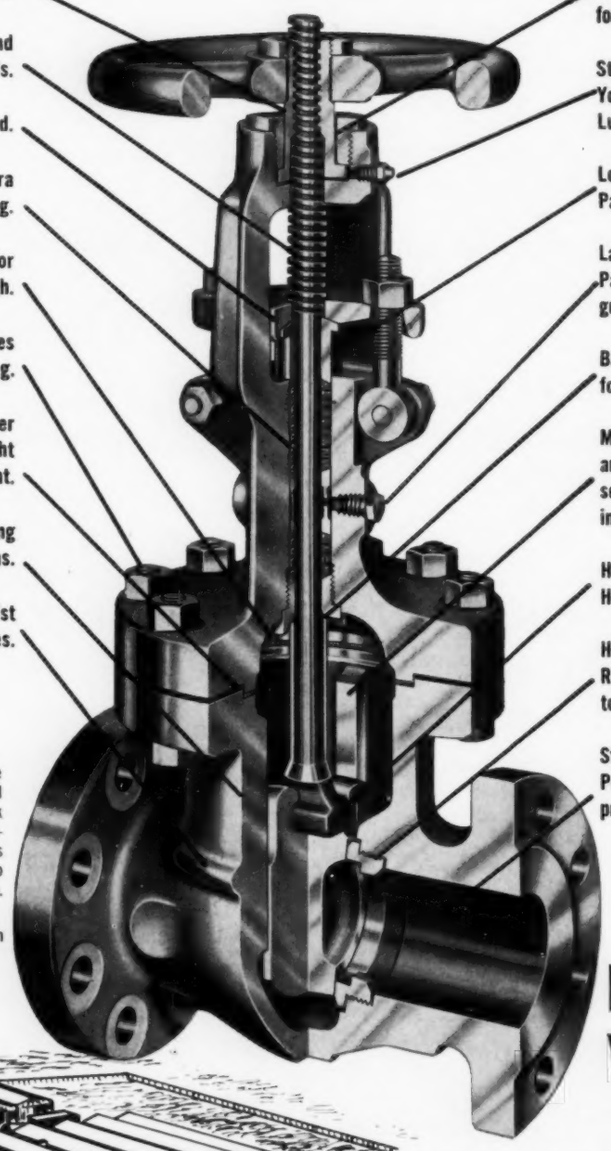

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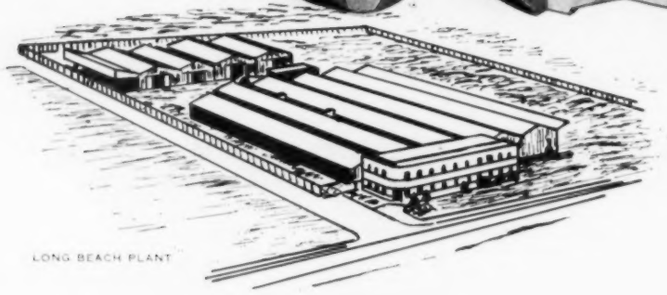

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BAHAMA ISLANDS

Exploration

Exploration in the Bahama Islands was not begun until passage of the favorable legislation later described. At that time, in 1945, more than 42,000 square miles were held by such companies as Shell, British Petroleum, Standard Oil (New Jersey), Gulf, and Superior. A well drilled by the latter in 1946 was dry, and many of the exploring companies surrendered their licenses.

At present there are four companies exploring. Bahama California Oil, owned by Standard Oil Co. of California, and Bahamas Exploration Co., owned by Gulf Oil Corp., initiated joint seismic work in the Cal Say area of about 1,700 square miles early in 1956. Bahama National Oil Co., an affiliate of National Oil Co. of California and Bahamas Sun Production Co., obtained a concession during 1956.

Production, Refining, Marketing

Aside from exploration, petroleum activities are slight. There is no production, no refining, and the small amount of marketing consists of imports for domestic consumption.

OIL LAWS

The governing petroleum law is the Petroleum Act of 1945, and regulations thereto of 1945, as amended October 28, 1954. Under the law, property to the subsoil is vested in the government.

The principle of reciprocity applies, meaning that interests in oil leases and rights may not be held by an alien person or company whose home country does not allow equal rights to British citizens.

EXPLORATION: Exploration licenses may only be obtained and held by companies incorporated in Bahamas Colony. The maximum size of each license is 1,000 square miles on land, or 15,000 square miles over submerged areas. Filing fee is 10 pounds sterling (about 28 dollars).

License duration is two years, at the end of which time an extension may be received of one additional year. The licensee may conduct geological and geophysical operations, but not drilling of exploratory wells. The area of New Providence is subject to license only with the consent of the Legislature.

The fiscal requirements of the license include, besides the filing fee previously mentioned, a fee of 50 pounds (about 140 dollars) per 1,000 square miles—the minimum being 100 pounds and the maximum fee 1,000 pounds.

The holder in good standing of an exploration license is entitled to an "oil prospecting license" which includes the right to drill exploratory wells. The maximum area per prospecting license is 200 square miles (with a minimum of 8 square miles). Duration is four years, with right to renewal at expiration thereof for one year additional, rental being doubled (10 shillings per square mile) during extension.

Fiscal obligations include a royalty of 12½% on the sale value of crude produced and saved.

As of November 1954, the licensee is obliged to drill one well with a 10,000-ft drilling rig in 4 years; and, if this well is not productive, another must be begun within 6 months. If more than one permit is held, this obligation, as fulfilled for one, covers all permits held by the permittee. The permittee has the right of surrender at any time.

EXPLOITATION: The holder of a prospecting license on the same area is entitled to conversion to "an oil mining lease," the maximum area of which is 100 square miles. This area may be over two or more separate, but geologically related, areas.

The duration of the concession (lease) is a maximum of 30 years, with the right of renewal for an equal period. It may be surrendered on 12 months' notice for the entire concession. If parts thereof are to be given up, six months' notice is required.

Royalty is 12½% of the sale value of the crude oil produced and saved, or 12½% of the actual sale value of natural gas produced. Annual rental varies from 2 shillings (28 cents) per acre in the first year to 10 shillings (about $1.40) in the sixth year and thereafter. These rental payments are deductible from royalties.

NATIONAL FACTORS

Several factors combine to make the Bahama Islands a favorable area from the standpoint of petroleum investment by private companies. One of these factors is the form of government; for, as a British crown colony with a large degree of autonomy (although the crown retains the right of veto and appoints the governor), the Bahamas have a long record of governmental stability, and this may be expected to continue.

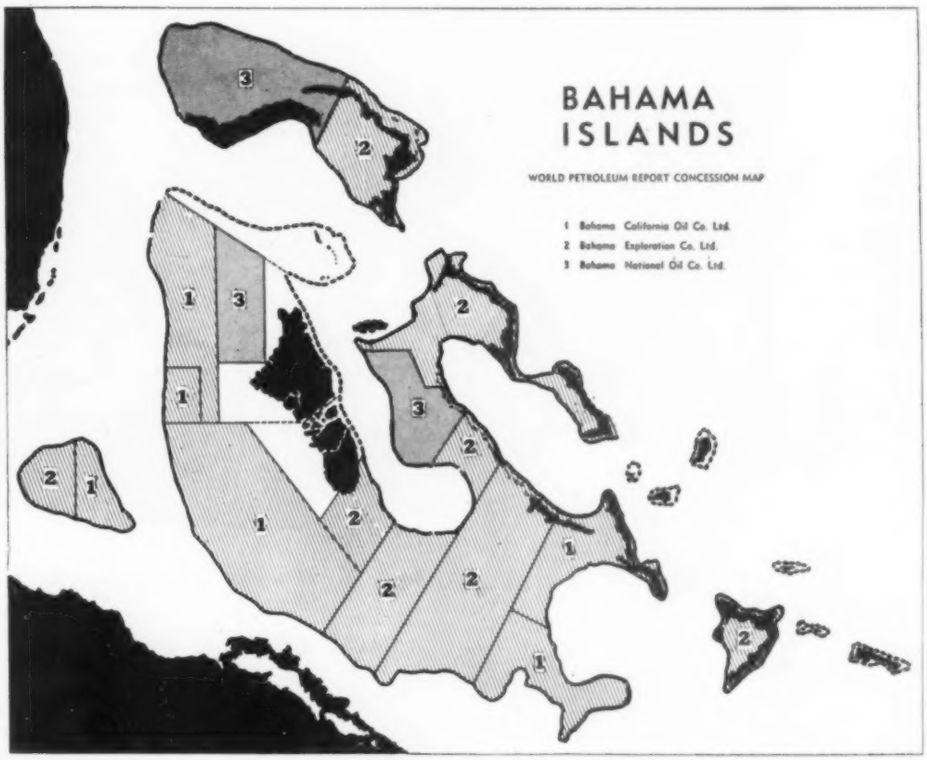
The attitude of the government is also influential, there being very few restrictions against foreign private capital, and this is reinforced by low taxation rates. No income, share, gift, nor property tax of any kind is levied. Import duties on equipment are moderate. If equipment is brought in from within the United Kingdom, the duties are reduced by 50%.

To these may be added the natural factors of good operating climate and an ideal marketing position, near the United States east coast.

On the debit side of the ledger there is the difficulty of profit remittances and capital amortization. The unit of currency, the pound sterling, is based on the British pound, with an official buying rate of $2.815 per pound and selling rate of $2.785 per pound. The general provisions of the sterling area against conversion of pounds to dollars apply; and, although much of this is left to the discretion of the local authorities at Nassau, the capital, permission of the Foreign Exchange Control Board must be obtained before profits received in the Bahamas may be converted.

Another factor is the requirement that companies holding oil licenses or leases be incorporated in the Bahamas. This includes the stipulation that two directors and the resident manager be British subjects and that the majority of employees be British.

Finally, from an investment standpoint, there must be considered the extensive holdings in the Bahamas at present and the type of terrain. The permits already in effect cover most of the favorable areas. The submerged areas entail the usual high monthly cost of under-water exploration—although the depth of northern Bahama banks rarely exceeds 20 ft. END


BAHAMA ISLANDS
WORLD PETROLEUM REPORT CONCESSION MAP
1 Bahama California Oil Co. Ltd.
2 Bahama Exploration Co. Ltd.
3 Bahama National Oil Co. Ltd.

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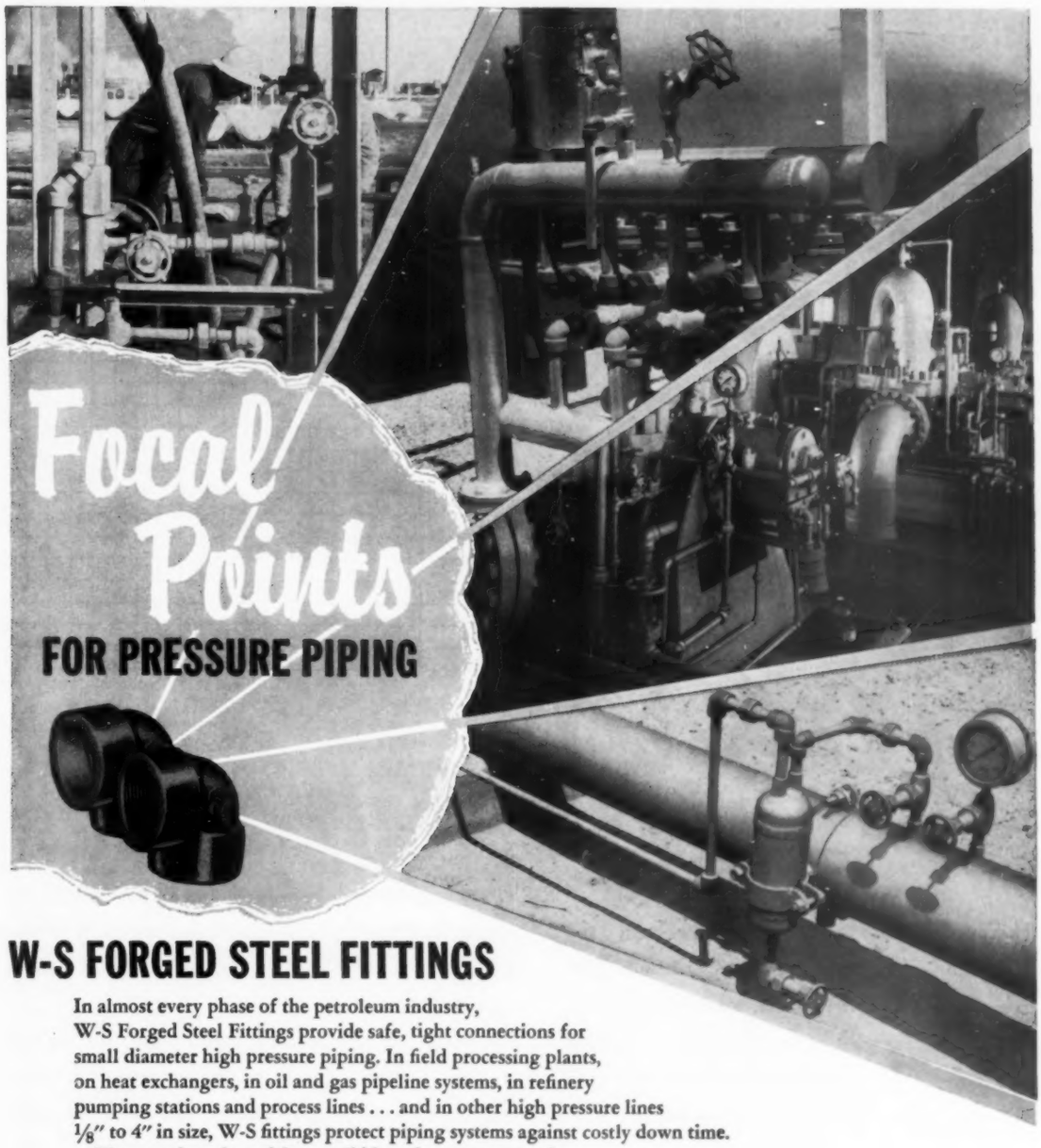

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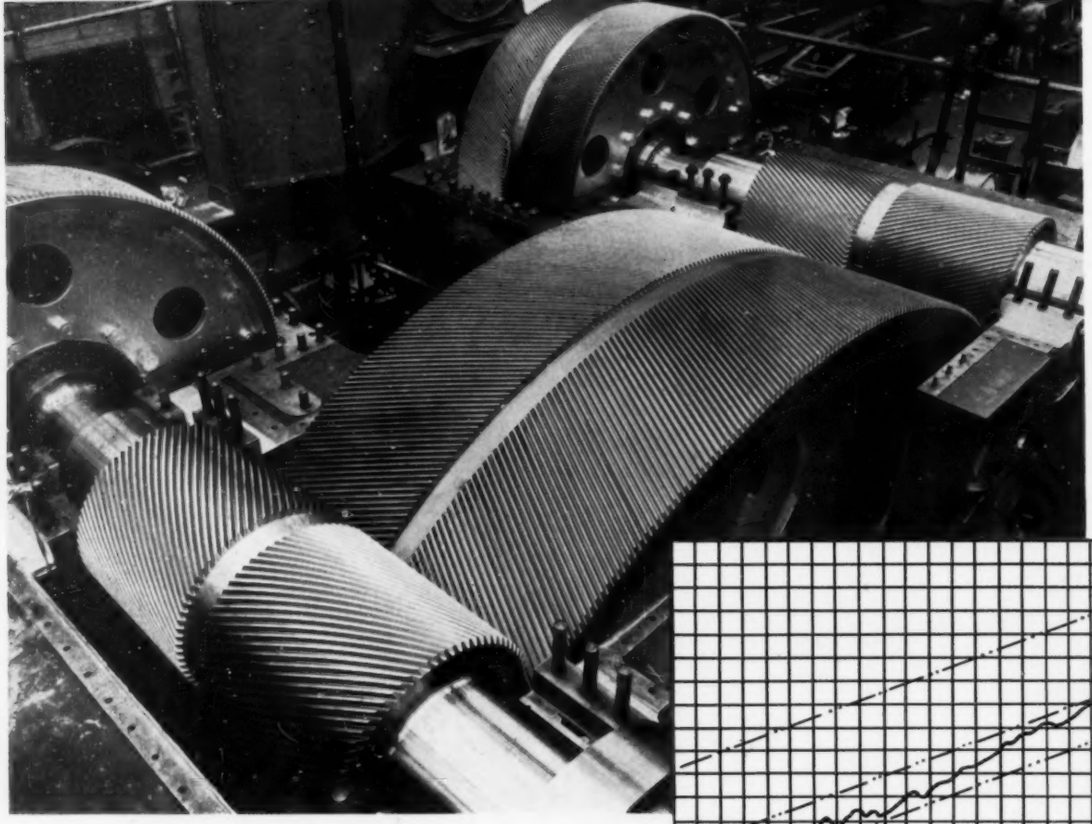

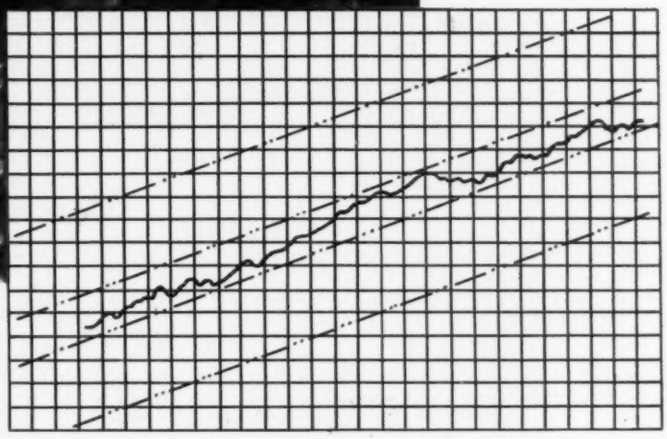

Gears

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The top right-hand diagram shows an example of the measured cumulative pitch error which is well within the tolerance for Class A gears according to British Standards.

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BOLIVIA

Exploration

The petroleum industry of Bolivia until recently has been virtually a monopoly of the State through two independent agencies: "Distribuidora de Yacimientos Petroliferos Fiscales Bolivianos," which controlled transportation, distribution, and the marketing of petroleum, and "Yacimientos Petroliferos Fiscales Bolivianos," which is in charge of petroleum exploration and development.

Gulf Oil Corp. recently became the first major oil company to enter Bolivia since the 1938 expropriation of Standard Oil Co. (N. J.). Gulf signed a "letter of agreement" with YPFB which paves the way for Bolivian Gulf to explore 3,750,000 acres within the reserve of the Bolivian government oil agency (YPFB). Within four years Bolivian Gulf may select 1,125,000 acres in which it will have exploitation rights for 40 years.

The company would pay the government 11% royalty in oil from production and a 19% exploitation tax payable in cash. The letter also calls for the company to help finance pipeline construction. Gulf is subject to a 30% tax on gross profits, payable in oil or foreign exchange. Three other US companies hold a 20% interest in the venture. They are Falcon Seaboard Drilling Co., Barry & Reiner Inc., and Williams Bros. (pipeline constructors).

The outstanding result of exploration recently has been the discovery of a new producing horizon in the Devonian formation of the Camiri field. Known locally as the Santa Anita sandstone, this formation boosted 1954 production by 182% over 1953—with the discovery well producing at the rate of 1,190 b/d. The formation appears to underlie much of the Camiri structure.

Two wildcats drilled by YPFB during 1955 were successful. One was Guairuy No. 6, which found 100 ft of pay in the Sararenda sand, with initial production at a rate of about 900 b/d. The second, Toro No. 1 in the southern Bermejo region, according to reports was a new-field discovery on a faulted anticline. Initial production, from the Tarija formation, was 380 b/d of 21-API-gravity oil and about 1,350 mcf of gas.

Another exploration discovery was by McCarthy on the Los Monos structure, where 4 wells drilled to date have a reported production of around 200 b/d each. These wells also produce from the Devonian, at 2,198 ft in the first well and 3,150 ft in the second. Plans call for two wildcat wells on a nearby structure known as Agua Salada, although there has been little activity reported recently.

Shell Prospecting Co. Ltd. applied during November 1956 for surface reconnaissance permits. The area applied for lies in the departments of Santa Cruz, La Paz, Beni, Chuquisaca, and Tarija. Most of these areas are in the territory reserved for private companies. Part of them, however, lies in the YPFB zone, which necessitates the same type of contract which Gulf has.

A joint commission was to meet last October to decide what action will be taken by Brazil on the 116-square-mile "Comision Mixta" exploration area. The new president-elect of Bolivia recently suggested on his trip to Brazil that the rights thereto should be renounced or guarantees of action given.

Production

Commercial production in Bolivia first began in 1931, when a Standard Oil Co. (N. J.) subsidiary brought in the Camiri field, located in southeastern Bolivia. Later, under YPFB, Camiri continued to supply most of Bolivian production—reaching a maximum of 678,000 bbl in 1949. In following years production began to fall off until, in 1953, the YPFB discovered deeper production. As a result, production in 1954 rose to 4,643 b/d and, by 58.9%, to 7,377 b/d in 1955. Largest part of this—73% by 1955 figures—came from the Camiri field. However, there are three other fields of lesser importance: the Guairuy, Sanandita, and Bermejo fields.

TABLE I

BOLIVIAN CRUDE PRODUCTION
(Thousands of Barrels Per Day)

January	8.5	July	8.6
February	8.8	August	8.8
March	8.2	September	9.0
April	8.5	October	9.4
May	8.5	November	9.1
June	8.5	December	9.2*
		Year	8.7*

*Estimate.

Since Bolivia has no seaports, plans have been made for construction of pipelines to neighboring countries and sale of petroleum thereto. Construction of one 6-in. pipeline of about 30,000 b/d capacity was completed in 1955 from the Camiri field to Yacuiba on the Argentine border; the other, from Cochabamba to La Paz, is constructing an extension to Chile. An agreement was recently reached with Paraguay for the construction of a 780-km pipeline (468 miles) from Bolivian fields to the River Paraguay. The first 130 km are to be financed by the Bolivian government, the remainder by the government of Paraguay. The Bolivian government has undertaken to export a minimum of 1,000 b/d to Paraguay, and may raise this amount to 5,000 b/d. The oil is payable in dollars at "international market prices," with the right to Paraguay to export same following satisfaction of her own internal requirements.

Refining

In 1955 increased production from the Camiri field boosted refinery runs to 5,829 b/d, or 2,127,636 bbl total. Production of major products during 1955 was as follows: motor fuel, 915,272 bbl; diesel fuel oil, 229,519; residual fuel oil, 747,229; kerosine, 145,832; aviation gasoline, 1,447.

Even the increased refining runs do not equal the total refining capacity of Bolivia. There are 4 refineries totaling 12,340 b/d throughput capacity—all owned by YPFB. The largest is at Cochabamba, with a total capacity of 5,850 b/d. The second largest is at Sucre, with 4,630 b/d capacity. Both are connected with Camiri by high-altitude pipeline. The two remaining are at Sanandita (410 b/d) and at Camiri (1,450 b/d). There is no catalytic cracking capacity at any of the refineries.

Marketing

Domestic consumption of major petroleum products in Bolivia during 1955 totaled 4,482 b/d, or 1,635,809 bbl—composed of motor fuel, 536,967 bbl; diesel oil, 214,658; kerosine, 148,028; aviation gasoline, 97,663; fuel oil, 633,753; petroleum ether, 643; turpentine, 5; aviation lube oils, 2,034; solvents, 57; and naphtha, 1.

Imports during 1955 totaled 102,064 bbl—all aviation gasoline. Exports were minor during 1953, about 183 b/d; but they increased with completion of the pipeline to Argentina, and will rise more when the line to Chile is completed. Total 1955 petroleum exports were valued at $2.13 million, rising to $6 million in 1956. They were 476,190 bbl of crude, plus 143,598 bbl of products, including 130,301 motor fuel; 6,636 kerosine; 6,309 fuel oil, and 352 diesel oil.

OIL LAWS

On October 26, 1955 a new petroleum law was passed in Bolivia, as summarized hereinafter.

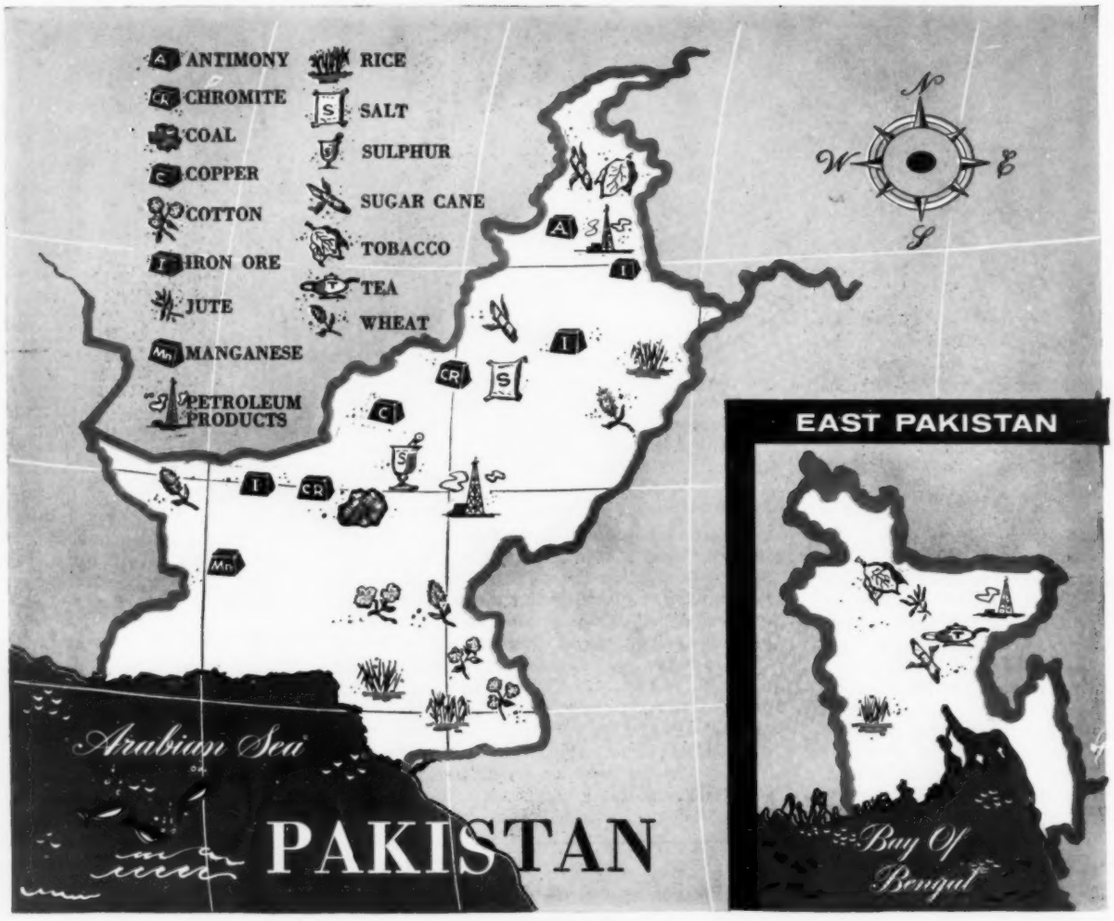
Concessions within 50 km of the frontiers are prohibited, as are concessions to companies controlled by foreign governments or Bolivian government officials. The entire territory of Bolivia is divided into three zones, as indicated on the accompanying map, and concessions may be granted therein—excluding the areas under contract to Brazil and under concession to YPFB.

EXPLORATION: The initial phase of exploration, consisting of reconnaissance operations, may be carried out under a preliminary permit which conveys no right to priority and has no specified area. All exploratory operations except drilling

TABLE II

BOLIVIAN SURFACE TAXES (EXPLOITATION)
(US Dollars)

				Zone I	Zone II	Zone III
Year	1	through	5	.15	.10	.08
	6	"	10	.45	.30	.15
	11	"	15	1.25	.80	.50
	16	"	20	1.50	1.00	.60
	21	"	30	1.25	.80	.50
	31	"	40	1.00	.50	.30



PAKISTAN, a vigorous new democratic nation with a population of 80 million and an area of 364,737 square miles, is roughly the size of Texas, Ohio, New York and Massachusetts combined. A land of wide rivers, jute fields, rice paddies and tropical jungles, Pakistan is divided into two "wings" separated by 1,200 miles. With the heritage of a civilization over 4,000 years old, this fertile land, essentially an agricultural country, was swept by invaders from the time of Alexander the Great. The first Muslim rulers established themselves in this area in the 10th century. British rule, dating from the early 19th century, was followed by complete independence on August 14, 1947. On March 23, 1956 the Islamic Republic of Pakistan came into being. Pakistan has taken tremendous strides toward industrialization. She is today the world's largest producer of jute—from which twines, ropes, and burlap are made. Cotton, paper, refined sugar, cement, matches, rubber tires, vegetable oils, and cigarettes are among the nation's manufactured products. Production of petroleum has shown more than a five-fold increase since 1947. Standard-Vacuum was the first oil company to sign an agreement with the Government which permits the exploration and production of petroleum on a modern cooperative partnership basis. The Company is now conducting extensive geophysical and geological surveys in both wings, and is drilling the first deep test well under the agreement.

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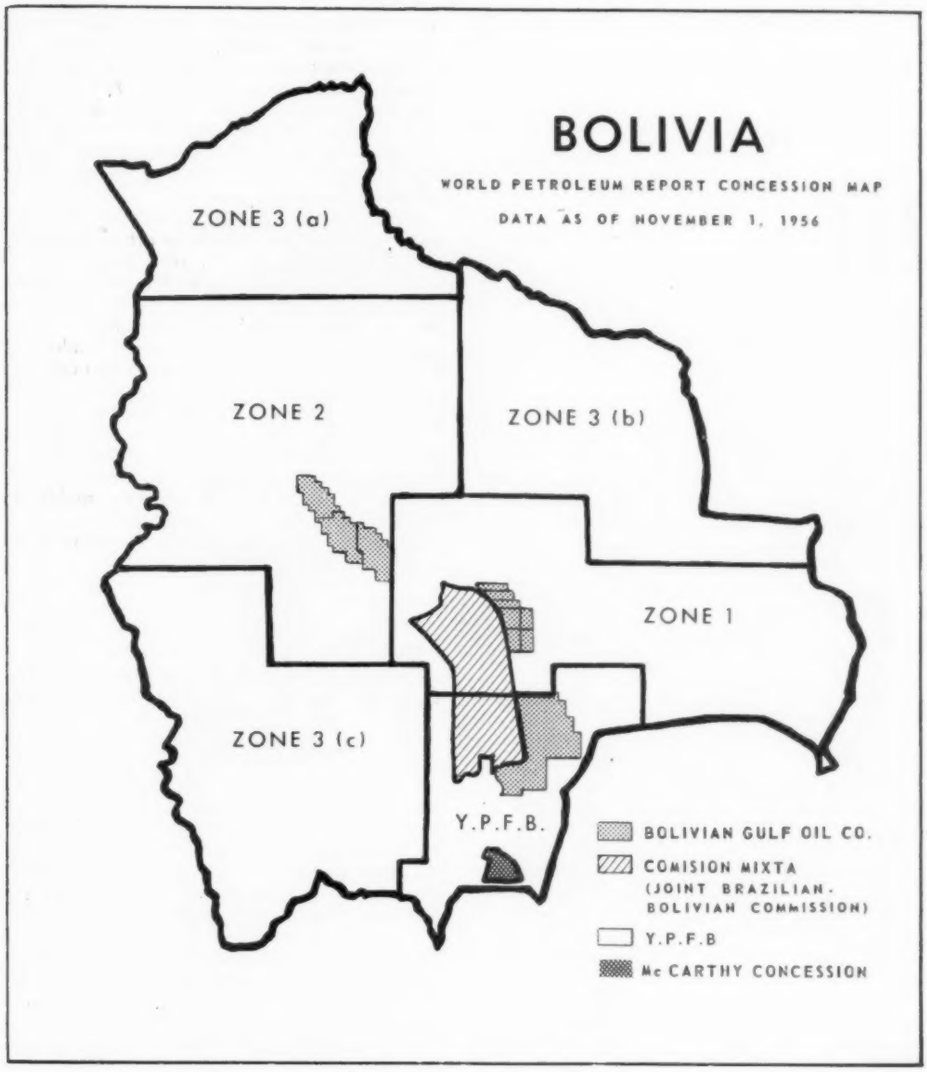


may be carried on. Duration is one year, with possible extensions.

The second phase of exploration includes drilling. It may be carried out by holders of an exploration-exploitation concession, the exploration part of which has a four-year duration in zones I and II, and six-year in zone III—with extensions possible only in the zones II and III, each for two years.

Exploration area per concession may not exceed 150,000 hectacres in zone I, 400,000 hectares in zone II, and 750,000 hectares in zone III. No single company may hold a total of more than 500,000, 1,500,000, and 3,000,000 hectares in zones I, II, and III, respectively.

Annual exploration surface taxes per hectare during the initial term are US 5 cents per hectare in zone III. During extensions of the exploration period the rates in zones II and III rise to 5 cents and 3 cents, respectively. On areas over 300,000 hectares, the tax rises to 7½ cents per hectare in all zones.

Minimum annual investment obligation is US 80 cents per hectare in zone I, 50 cents per hectare in zone II, and 20 cents per hectare in zone III. A guaranty deposit is required of 20, 10, and 5 US cents per hectare in zones I, II, and III, respectively.

EXPLOITATION: Exploitation may occur under the combined exploration-exploitation concession or by exploitation concession obtained under separate request. Duration is 40 years, with no provision for extension.

Maximum area per exploration concession in zone I is 75,000 hectares (about 187,500 acres), with a maximum total per person or company of 500,000 hectares (about 1,250,000 acres). Zone II maximum per concession is 200,000 hectares (about 500,000 acres), with a maximum total of 1,500,000 hectares (about 3,750,000 acres); and zone III maximum per concession is 375,000 hectares, with a maximum total of 3,000,000 hectares (about 7,500,000 acres). Within these maximums there is no limit to the number of concessions held by one entity.

Drilling obligations for every 100,000 hectares (about 247,000 acres) held comprise a minimum of 5,000 meters (about 15,000 ft) of hole drilled during the first 7 years of the concession in one or more wells. During the following 8 years the drilling obligation consists of two or more wells with a total depth of 10,000 meters (about 30,000 ft) for every 20,000 hectares (about 50,000 acres) of concession retained. These do not include slim-hole drilling nor stratigraphic tests. For every meter not drilled within these limits, a fine of 20 dollars during the first 7 years is payable and 30 dollars during the following 8-year period.

The concessionaire (exploration or exploitation) has the right to renounce all or part of the concession at any time.

An initial surface tax is payable per hectare of US 40 cents in zone I; 30 cents in zone II; and 20 cents in zone III. An additional annual surface tax per hectare is payable in US cents during exploitation.

From these additional taxes any royalty paid is deductible, down to a minimum annual tax of 15 cents per hectare in zone I; 10 cents per hectare in zone II; and 8 cents per hectare in zone III.

A royalty of 11% is payable in kind or in cash. In zones II and III this royalty may be reduced to 7½% for no more than 15 years.

The concessionaire is subject to a fixed income tax of 30% on his net earnings in Bolivia. Deductions allowed include costs of exploration, intangible drilling and development costs, and administration costs. A depletion allowance is given free of tax amounting to 27% of gross up to 50% of net, calculated before deduction of depletion factors. Surface taxes paid are not deductible as operating expense.

Any amount remaining of net income after imposition of the 30% tax mentioned previously, and deductions, will be subject to an excess-profits tax of 50%. Taxes may in no case exceed 50% of net income, and the concessionaire is not subject to general taxes of the country, but only to petroleum taxes as outlined above. All taxes are to be paid in US currency.

The development concessionaire is exempt from import duties on equipment and from any tax on exports of petroleum or products, and may retain the proceeds therefrom, either in Bolivia or abroad. Capital, as well as profits, may be freely imported and exported at the most favorable exchange rate available to any other person in the country at the same time.

REFINING AND TRANSPORTATION: Holders of exploration or exploitation concessions have the right to apply for and receive, subject to government approval of their plans, a concession over refining or transportation of petroleum, limited to the duration of the exploration and exploitation concession. These concessions may also be given directly, in which case the maximum duration is 40 years. They are subject to general (as well as petroleum) taxes.

NATIONAL FACTORS

The principal national factors for consideration with respect to petroleum investment in Bolivia are the records of governmental stability and attitude toward foreign private investment.

One major aspect of these factors is the expropriation of Standard Oil Co. of Bolivia. Standard (N. J.) obtained its original concession in 1921. By 1937 about 30 wells had been drilled, with an investment of some 17,000,000 US dollars. During the period of the Bolivian-Paraguayan war over the Gran Chaco the charge was made by the Bolivian government that crude was secretly being exported by pipeline to Argentina, and the company's holdings were seized on March 15, 1937. Settlement was made by Bolivia in 1943 in the amount of 1,500,000 US dollars.

The large tin mining companies in Bolivia were expropriated, effective June 2, 1952.

Politically, Bolivia has been unstable in the past, but appears to enjoy relative stability at present. The administration has expressed a favorable atittude toward foreign private investment in oil, as demonstrated by the new petroleum law, and by statements by political leaders.

The detrimental aspects of exchange problems and convertibility are eliminated by the provisions of the petroleum law. However, for industries other than petroleum, the rapid depreciation of the boliviano to almost 6,000 to the dollar, as compared with the official rate of 190 per dollar, constitutes a grave problem. END

BRAZIL

Exploration

All exploratory work in Brazil is through the government's Petrobras, a company described later herein, which has a monopoly over the entire country. To date the outstanding result has been the discovery, early in 1955, of the Nova Olinda well in the Amazon basin, about 90 miles up the Madeira River. This well produced about 600 b/d on the pump from 8,910 ft on initial tests. It is the outstanding recent test since the discovery of the Candeias field in 1941, and shows that the sedimentary section of the basin, the potential productive section, is considerably greater than originally thought. Pumping during 1956, however, proved ineffective, and was discontinued.

Geological studies to date reveal the existence of 10 sedimentary basins in Brazil, covering an area of 1,351,000 square miles, or 41% of national territory. Of the total, 579,000 square miles lie within the Amazon basin.

Geological and geophysical work was proceeding in six basins in 1956, viz., Amazon, Maranhao-Piaui, Rio Grande do Norte, Alagoas-Sergipe, Bahia, and Parana. By September a seismograph team had also started working offshore on the east coast, beginning with All Saints Bay, at Bahia.

During the first 9 months of 1956 the number of teams operating—geological, seismograph, and gravimetric—was raised to 32 from 19, and 5 more began exploration work in other areas of the south and west center. Research will cover the southwestern region of Sao Paulo, the eastern part of Mato Grosso and South Brazil, covering the Parana and Uruguayan basins. By September, 27 rigs were operating and 14 others arrived during the next 3 months.

Preparations are under way to drill VX1-AZ at the junction of the Abacaxis and Parana de Uraria Rivers, in the state of Amazonas. At least six other wells—three stratigraphic and three wildcats—were started in the Amazon basin in 1956.

Early in 1956 oil and gas shows were obtained from the Testa Branca well in Maranhao at a depth of 4,220 ft to 4,240 ft. The well is not far from the city of Balsas. A previous deep test in the Maranhao basin, Vg-1R-Ma, was on a surface geologic and seismic prospect, 55 miles east of Carolina. It was dry in the Devonian at 9,476 ft.

The Parana basin was tested unsuccessfully by J-1-Pr, a new-field wildcat drilled approximately 300 miles west of Sao Paulo. It reached a total depth of 8,809 ft, believed to be the Devonian. This is the second unsuccessful deep test of this basin.

The Dom Joao field was extended four miles offshore into the Bay of Todos do Santos, during 1955. The Agua Grande field was also expanded by successful drilling. These finds contributed to a government proved crude reserves estimate in 1956 of 250 million barrels, nearly 10 times USA previous estimates.

Wildcats drilling, as of September 26, 1956, were as given in Table I.

Of 23 wells completed in the Reconcavo in the first half of 1956, 19 are producing oil, and 4 are dry; 8 others are now drilling, and 8 are being prepared for drilling. The footage drilled in this area between January-June totaled 119,350 ft, viz., wildcats 30,927; development wells, 88,423.

The Petrobras program, which is ahead of schedule, provided for 70 development wells and 29 wildcats in 1956, as against a total of 55 wells in 1955. Slim holes are not included in these figures. Colonel Nunes predicts that 1,454 wells will be drilled by 1960.

TABLE I—BRAZILIAN WILDCAT DRILLING
(September 26, 1956)

Well	Depth (Feet)	Well	Depth (Feet)
Amazon		Rio Grande do Norte	
Abacaxis (RX1-AZ)	8,547	Macau (MC1-RN)	1,427
Nova Olinda (NO2-AZ)	7,637		
(NO3-AZ)	5,463	Bahia	
Cupari Tapajos	5,232	Jacuipe (JA1-BA)	9,295
Maranhao			
Testa Branca (TB1-MA)	6,084	Parana	
Trinidad Is.	1,430	Candido de Abreu (CA1-PR)	8,417
Mocambo (MO1-MA)	9,409		

TABLE II
BRAZILIAN RUNS TO STILLS
(First Half 1956—Metric Tons)

	Mataripe	Bernardes
January	28,545	291,563
February	28,483	207,633
March	30,810	314,483
April	29,311	285,578
May	28,797	219,072
June	30,008	307,900

Production

The only productive area to date in Brazil is the Bahia Reconcavo, which extends from All Saints Bay to a line passing near Coracao de Maria, south of Inhambupe and the Arapoa range. The Reconcavo fields produced 2,021,900 bbl (5,521 b/d) in 1955 and 4,228,330 (11,584 b/d) in 1956, on the basis of the production figures for the first 9 months.

Refining

Petrobras has had a monopoly over refining, excepting those refineries already built or authorized before June 30, 1952. Since 1937 only wholly owned Brazilian companies have been able to refine, and more than half the refining industry is government-owned at present.

Brazil has a total of 8 refineries, with a combined processing capacity of 111,800 b/d. Refining runs in 1955 totaled 24,161,766 bbl (66,197 b/d), about 1.5% over 1954 levels. Of the 1955 refining output, 46.29% was gasoline; 39.97%, fuel oil; 8.88%, diesel oil; 2.08%, gas oil; 0.37%, kerosine; and 0.22% solvents.

The Presidente Bernardes refinery (nominal capacity 45,000 b/d) has been processing 72,000 b/d since September 22, 1956, owing to improved operating techniques. The refinery began distributing type "B" gasoline, 83-octane, to the Sao Paulo market in October 1956.

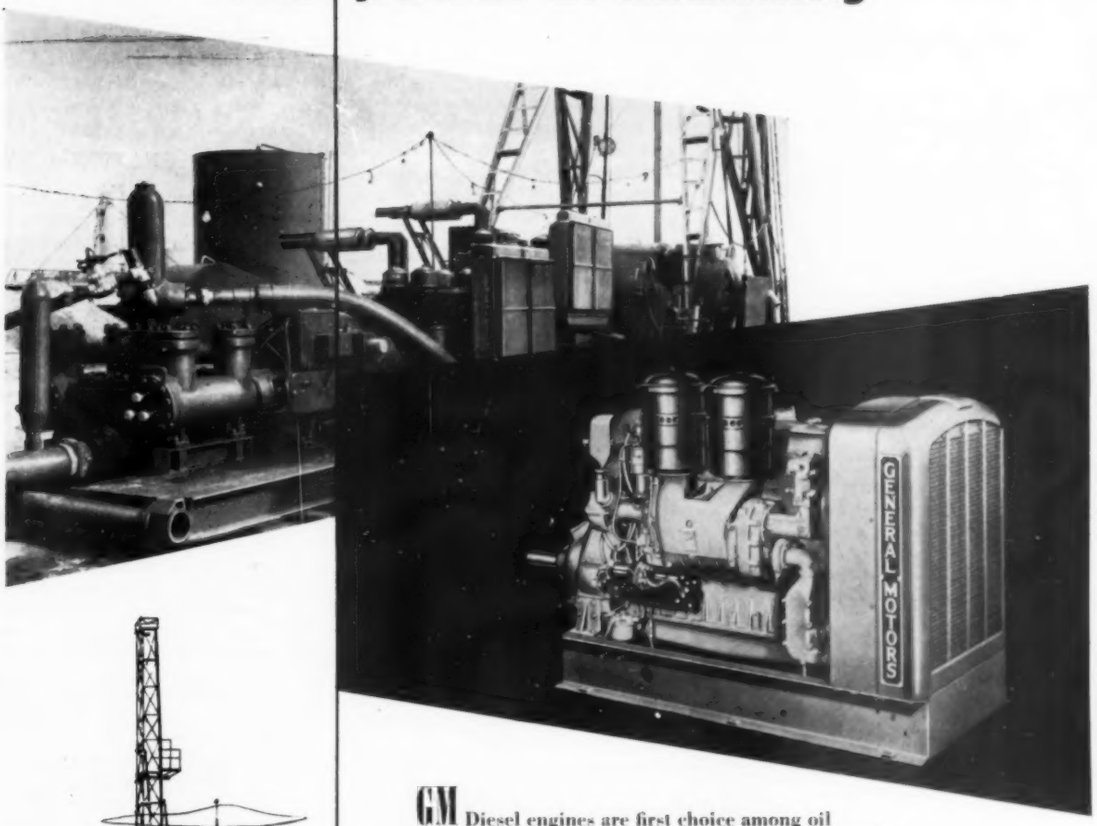
Petrobras called for preliminary tenders on October 3, 1956 for engineering works, materials, and equipment for a 50,000 b/d refinery, to be built in, or near, the Federal District.

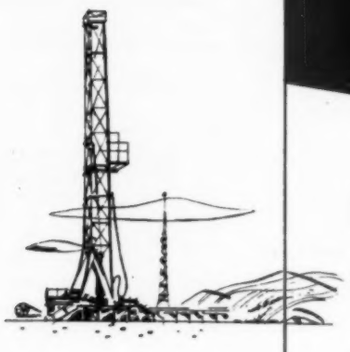
Two other refineries are to be built, adding at least 80,000 b/d to refining capacity. According to an official spokesman, these will be located in northeast Brazil, presumably in Pernambuco; the other at Corumba, capital of Mato Grosso, provided the bill now before Congress is approved.

Transportation

There was one crude pipeline, completed in 1956. The 6-in. line, 32.4 miles long, was inaugurated on May 10. It starts at the Catu field, traverses Pojuca and Mata de Sao Joao fields, and continues to Candeias field and Mataripe refinery. It crosses the Pojuca and Jacuipa Rivers on suspension bridges with 130-ft and 292-ft spans; 40 tanks, with capacities ranging from 250 bbl to 20,000 bbl, are located at the 3 new fields. The oil is stored at Mata and pumped to Candeias and Mataripe refinery. Owing to the high paraffin content it is heated before pumping and in transit from Mata to Candeias by three intermediate heating stations. The only other pipeline system in Brazil runs 36 miles between Santos and Sao Paulo, with lines for crude and refined products. It was built for the National Petroleum Council by William G. Hetzel and Techint, and is administered by the State-owned Santos-Jundiai Railway. Its primary objective is to relieve the railway of oil transport. There are two 10¾-in. lines from Alamoa to Cutatao station; one of 10¾-in. diameter from Cubatao to the terminal at Utinga; two 6⅝-in. lines between Utinga and Mooca; one 18-in. line between Alamoa and Utinga; and one 14-in. line from Utinga to Mooca, a suburb of Sao Paulo. The lines are connected with the Santos docks, and the branch lines to the five principal oil companies' depots. Another branch connects with the Uniao refinery.

The power of economy





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SWITZERLAND, Bienne
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VENEZUELA, Caracas

In 1956 Petrobras received two 1,200-ton ships, especially built in Germany, to carry liquid gas and a 1,200 tonner built in England to carry lubricants. The expansion provides for the purchase of another vessel for lubricants and for ocean-going ships of a total tonnage of 180,000. The existing fleet consists of 22 ships with a capacity for 223,000 tons, which effected a saving of 900 million dollars in freights in 1955.

Marketing

Domestic production supplies only about 12% of domestic consumption. Crude imports during 1956 are estimated at 98,360 b/d. Product imports for 1956 are estimated at 62,041 b/d.

The cost of petroleum imports is high, particularly because they come mostly from Venezuela, a dollar area. Despite increasing local production of crude and refined products, Petrobras estimated that the value of imports would reach 270 million dollars in 1956, as compared with 259 million in 1955.

Consumption in 1955, according to Brazilian sources, averaged 181,793 b/d, about 12.5% over 1954 levels as given by the US Bureau of Mines; 88.62% of 1955 consumption was imported at a cost of 256,008,000 dollars.

Retail prices of products within Brazil were increased by order No. 500 of February 24, 1956. Different levels were established according to locality. At Sao Paulo regular gasoline was selling at 5 cruzeiros per liter (79 cents per gallon); kerosine, at 3.13 cruzeiros per liter (45 cents per gallon); diesel oil, at 1.64 cruzeiros per liter (24 cents per gallon), using the official exchange rate.

The president of the Brazilian Bank for Economic Development announced in October that Petrobras had adopted the following targets for 1957-61, instead of those previously fixed for 1956-60 (which are shown in brackets): Crude production, 130,000 b/d (120,000); refining, 270,000 b/d (240,000), including the output of private plants; increase in tanker fleet to 500,000 tons (400,000).

OIL LAWS

The Constitution of Brazil, dated September 18, 1946, in Art. 153, provides that authorization to engage in mineral exploration and development may only be granted to Brazilian citizens or "companies organized in Brazil." This last would not exclude foreign ownership, and was not originally intended to, but has been so construed by succeeding governments. The basic petroleum legislation is Decree-Law 3236 of May 7, 1941, with Decree-Law 1985 of January 29, 1940 the general mining law, which governs petroleum when not in conflict with the petroleum law. However, terms of the law are of little importance to investors, since by Law 2004 of October 3, 1953 the entire petroleum industry of Brazil, excepting marketing and some refining, was made a monopoly of Petrobras (Petrolero Brasileiro Socíedade, e Anonima), principally a government-owned company, under its supervisory agency, the National Petroleum Council. Petrobras operates subject to the petroleum law outlined. Refineries established or authorized before June 30, 1952 are excepted from the monopoly, as are petroleum transportation enterprises, although the latter may not be expanded.

Ownership of Petrobras was originally 100% by the government, but stock up to 49% may be held by Brazilians or Brazilian-owned companies. Initial capital was 4 billion cruzeiros (around 56 million dollars), to be raised to 10 billion cruzeiros by 1957. States and municipalities wherein petroleum is encountered may receive 8% and 10%, respectively, of Petrobras stock.

Head of Petrobras is Colonel Janary Nunes, and geological exploration is directed by Walter Link, formerly with Standard Oil Co. (New Jersey).

Several attempts have been made in recent years to pass petroleum legislation permitting foreign investment. The latest of these attempts was in 1955, when three senators, viz., Plenio Rompeu, Otor Mader, and others, proposed a law which would permit foreign ownership of petroleum rights and companies in Brazil. Exploration and exploitation would be combined into a single concession, under this bill, of a maximum 600,000 hectares (about 1,250,000 acres) with an exploration term similar to the present petroleum law. On conversion of the concession to exploitation, 50% of the original area could be retained as an exploitation concession while the remaining 50% became part of national reserves. Fiscal provisions of the draft law were based on the 50-50 profits split.

This draft law failed of passage and did not gain important support, since politically the issue of foreign participation is troublesome, particularly during an election year. However, the newly elected president, Juscelino Kubitschek, has stated that he will give Petrobras one year to prove its capacity to develop petroleum at a satisfactory rate and, if not satisfied, will "take appropriate action."

TABLE III—BRAZILIAN REFINERIES

Company	Location	Crude Capacity	Cracking Capacity
Companhio de Petroleo da Amazonia	Manaus[1]	5,000	—
Distillaria Riograndense de Petroleo SA	Uruguaiana Rio Grande do Sul	300 S	—
Industrias Matarazzo de Energia SA	Sao Paulo	500 S	—
Petroleo Brasileiro SA (Petrobras)	Mataripe[2]	5,000 SC	3,000 T
	Cubatao Presidente Bernardes[3]	65,000 SC	8,000 T
Piranga SA Cia. Brasileira de Petroleo	Rio Grande do Sul	6,000 SCA	2,000 T
Refinaria e Exploracao de Petroleo Uniao	Sao Paulo	20,000	—
Refinaria de Petroleo de Manguinhos	Rio de Janeiro	10,000 S	—

(1) Completed 1956.
(2) Actually processing 6,000 b/d. Under construction: Crude capacity to be increased to 37,000 b/d; 2,800 b/d lube plant, complete end of 1957.
(3) 116,000 tons year asphalt capacity. Under construction: Crude capacity to be increased to 90,000 b/d ethylene-recovery unit.
Note: Petrobras to build 90,000 b/d refinery in Federal District.
S—Skimming. C—Cracking. T—Thermal. A—Asphalt.

TABLE IV

PRODUCTION IN BRAZIL (AUGUST 1956)

Field	Number of Producing Wells	Production (Barrels)	Wells Producing
Agua Grande (Catu)	26	153,635.73	16
Aratu	2	—	—
Candeias	80	119,683.87	53
Dom Joao	126	37,867.05	36
Itaparica	25	—	—
Lobato	4	246.26	2
Mata de Sao Joao	17	7,905.81	7
Paramirim	2	3,336.22	2
Pedras	12	—	—
Pitanga	1	—	—
Pojuca Central	6	—	—
	301	322,674.94	116

TABLE V

REFINING AND CONSUMPTION IN BRAZIL
(5 Months 1956—Barrels)

	Refining	Consumption
Liquefied gas	430,446	538,892
Aviation gasoline	—	894,563
Regular gasoline	7,115,772	8,382,916
Kerosine	143,009	1,803,220
Diesel oil	945,320	4,430,060
Fuel oil	5,563,137	10,220,921
Lubricants	—	595,120

TABLE VI

BRAZILIAN CRUDE PRODUCTION—1956
(Thousands of Barrels Per Day)

January	6.8*	July	7.2
February	7.0*	August	11.2*
March	7.0*	September	20.0
April	7.1*	October	19.6
May	7.2*	November	18.8
June	7.2*	December	23.1
		Year	11.8

*Estimate.

NATIONAL FACTORS

The primary factor affecting petroleum investment is the government's attitude toward foreign investment in the petroleum industry. Brazil has been closed to foreign petroleum investment in the past, but due principally to the suicide of President Vargas and the accession of the recent conservative candidate, General Kubitschek, the long-awaited change in restrictions against foreign participation appears now more likely to arrive eventually than at any previous time.

The petroleum legislation in effect at present has certain defects, apart from its restrictive provisions dealing with nationality of operators. Among these are the small permit areas which can be granted to a single operator, the high degree of government control implied, and the lack of a definite duration for exploitation rights. The small size of total permit area is particularly disadvantageous in view of the large land area, slightly larger than the United States and covering about 47% of South America, some 3.2 million square miles.

Similar in importance is the political and economic stability. The forced pace of industrialization has resulted in a chronic dollar shortage and instability in the exchange value of the cruzeiro, Brazil's monetary unit. This has led to, and has been furthered by, political instability wherein the military's role has been decisive. Economically, the situation can improve little without substantial capital importation. Petroleum investments are especially important because about 17.1% of total imports by value during 1954 were of petroleum and its products.

The unit of currency is the cruzeiro. It is subject to multiple exchange rates, with the official rate 18.36 per dollar or 5.45 US cents per cruzeiro There have been successive devaluations and special rates. The rate applicable to imports varies, but for certain investments from abroad special provision is given to allow use of the advantageous free rate, averaging 74.50 per dollar in 1955. These investments of "special interest" to the country have the right of repatriation over 10 years of capital invested at the official rate, or immediately at the free exchange rate. Profits may be exported immediately at the free rate or at 10% of capital invested annually if the official rate is used. The exchange tax of 8% is not imposed on such investment returns.

Other factors affecting investment favorability include taxation, which is comprised of an income tax of 20% to 50% on companies, and labor legislation which is not burdensome, with provisions not dissimilar to those in the United States. Wage rates are relatively lower, with present minimum wages in Rio set at the equivalent of US $212 (3,800 cruzeiros) per month. Effective daily wage rates in the petroleum area of the Bahia basin during 1954 were US $1.93 for unskilled and US $2.40 per day for skilled labor. Two-thirds of employees and of total payroll must be Brazilian. END

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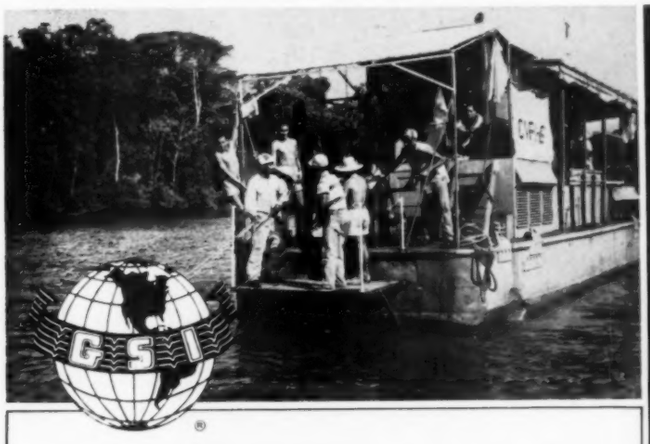

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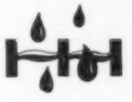

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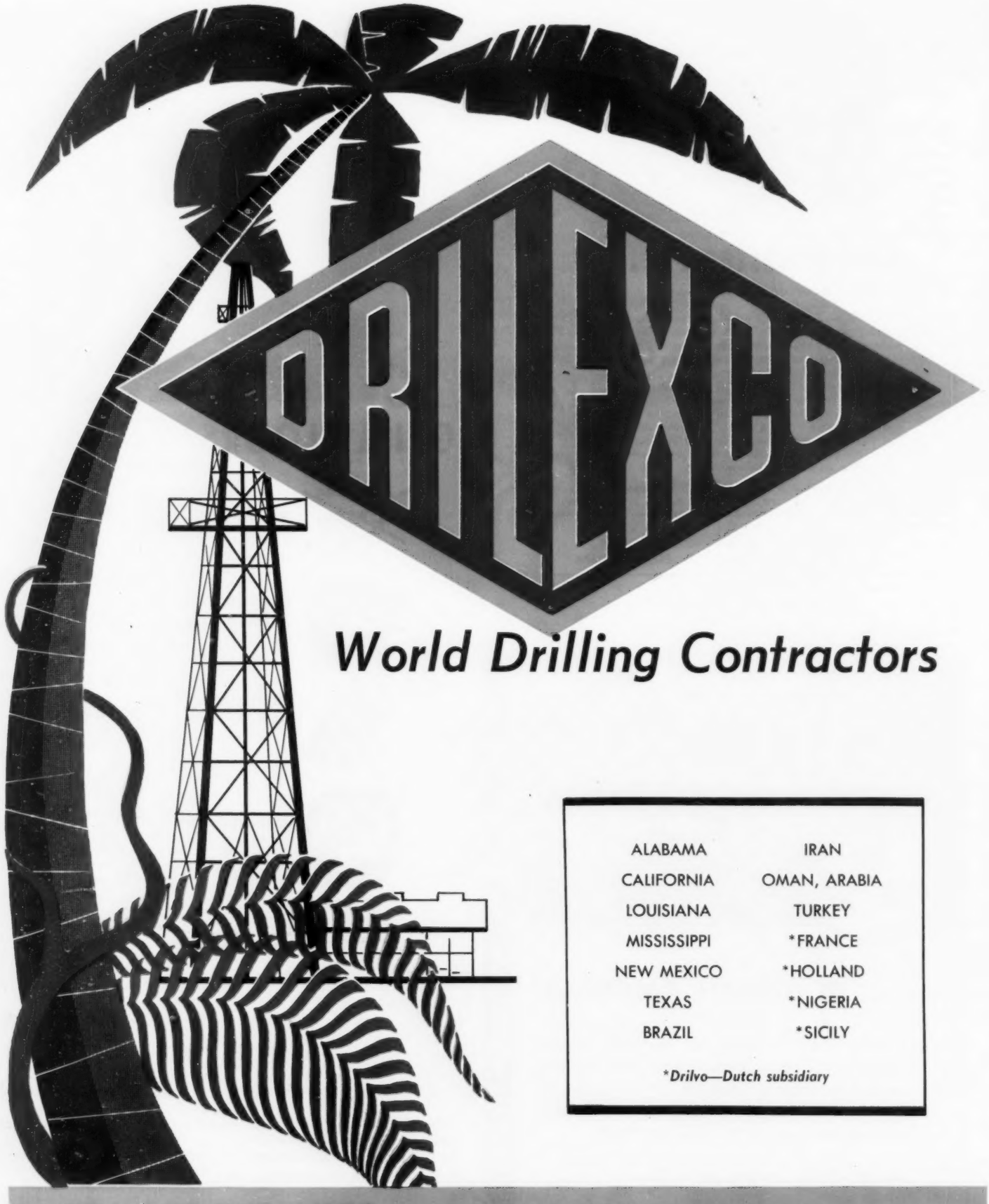

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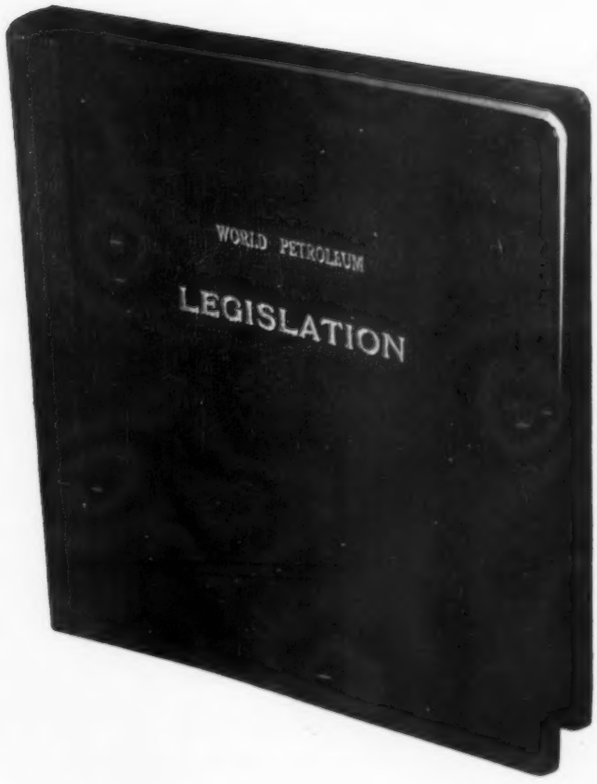

Summaries of petroleum legislation and/or concessionary arrangements in the following countries have been compiled and will be available soon:

Algeria
Argentina
Australia
Bahamas Islands
Bolivia
Brazil
British Honduras
Chile
Costa Rica
Colombia
Cuba
Ecuador
Egypt
France
Morocco
Guatemala
Haiti
Honduras
India
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Pakistan
Panama
Papua
Peru
Philippines
Portugal
Saudi Arabia
Spain
Switzerland
Syria
Trinidad
Tunisia
Turkey
Venezuela

United States

Summaries are in loose-leaf form and are maintained current as required by the passage of new legislation. They may be purchased in a single volume which contains summaries of all the countries listed, or on an individual country basis. Price range from $10 to $20 per country, up to $190 for the complete set, including revisions for one year.

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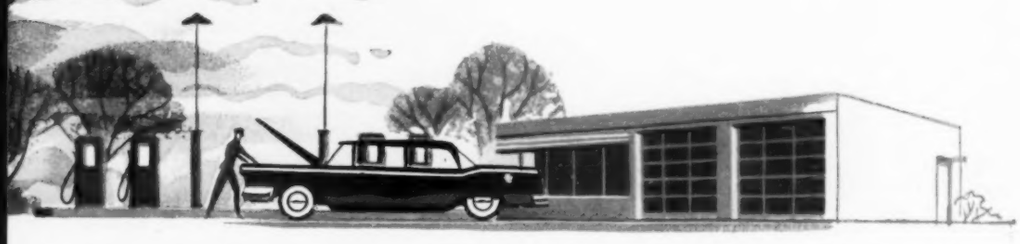

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BRITISH HONDURAS

Several companies have explored in British Honduras in the past, but there is only one at present, the Bahamas Exploration Co. Ltd., now the British Honduras Gulf Oil Co., a subsidiary of the Gulf Oil Co., which holds 30 oil exploration licenses covering the entire country, obtained in 1949. On June 20, 1955 the company spudded Yalbac No. 1, the first exploratory well in the country. It was dry at 9,003 ft during March 1956. A second well, Hillbank No. 1, was spudded, and abandoned dry at 6,650 ft in late 1956. The company has now called a halt to exploration, pending review of all data obtained.

Aside from exploration, there is little development of the petroleum industry in its other phases. There is no production nor refining. The domestic market is supplied entirely by imports, which amounted in 1951 to 57,619 bbl or 157 b/d. They consisted of approximately 47% gasoline, 37% diesel fuel, and 16% kerosine.

OIL LAWS

Only companies organized in British Honduras or in the British dominions are eligible to hold exploration or development rights in petroleum. There is no restriction on ownership of the company, however, and an American-owned company would be eligible for such rights. The principle of reciprocity applies, i.e., only nationals or companies of countries allowing British subjects or companies to hold similar rights are eligible. This is a provision found in most British-controlled areas, and USA companies qualify for such rights.

The law controlling petroleum exploration and/or development is Petroleum (Production) Ordinance No. 17 of 1937, and Oil Mining Regulations (Statutory Instrument No. 56) of 1949. Art. 2 of the 1949 regulations expressly vests in the crown ownership of the subsoil and appears to include in this any oil right acquired prior to the original law, Oil Mines Ordinance No. 32 of 1920, which applied only to crown lands.

The law and its regulations provide for three phases of oil rights: "oil exploration license," "oil prospecting license," and "oil mining lease." The content of these is outlined hereinafter. In addition, there are certain "model clauses" or "schedules" provided by the colony which may form part of the oil right obtained. There is no limit on the number of licenses or leases which may be held by one party or company, and such licenses or leases may cover either crown or private lands, as illustrated in the case of the Gulf concession previously cited, which covers the entire country. However, these licenses or leases do not cover submerged areas except by special approval by the government. In all rights, license or lease, an appropriate bond—amount to be specified by the governor—must be posted.

EXPLORATION: The "oil exploration license" covers preliminary reconnaissance. There is no maximum area, but the minimum area of the license is eight square miles. The duration of the license is two years, with a one-year renewal granted on the governor's discretion. A surface tax or fee is levied at the rate of 250 British Honduras dollars (about US $175) per 1,000 square miles, with a minimum of 500 and a maximum of 5,000 British Honduras dollars per license. Application fee is 50 British Honduras dollars, (about US $35).

The "oil prospection license" covers more detailed exploration, including drilling. The licensee is obligated to carry out a geological or geophysical survey or to drill a test well within four years, as may be specified in the license. Minimum license area is eight square miles, maximum is 500 (unless permission for more is given by the governor). This area must be of compact shape and of a length not exceeding six times its width. The duration of the license is four years, with one-year renewal grantable by the governor at his discretion. The conversion to this license from the "oil exploration license" appears not to be guaranteed. It may be granted whether or not the applicant has held an "oil exploration license" on the same area previously.

Fiscal obligations of the "oil prospection license" include an application fee of 100 British Honduras dollars, an annual rent, and a royalty. Annual rent is one British Honduras dollar (70 US cents) per square mile during the initial four-year term, with a minimum of 50 British Honduras dollars. During renewal of the license the annual rent and minimum are doubled. Royalties on production which may be obtained are 12½% of the value of the crude oil and casinghead gasoline produced and 0.02 British Honduras dollars (14 US cents) per thousand cubic feet of natural gas produced. If the natural gas is sold to other producers for repressuring, the royalty is one-half the above rate. The annual rentals are deductible from royalties paid.

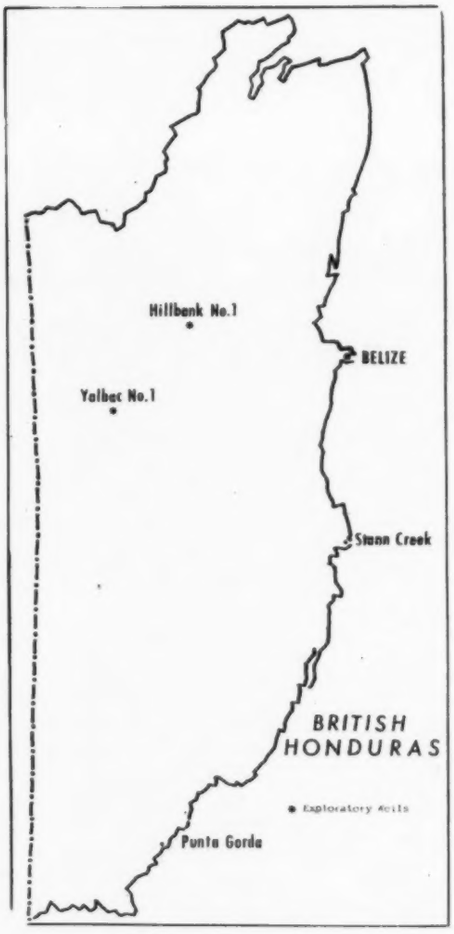
EXPLOITATION: The "oil mining lease" covers development of wells discovered. It is grantable only to the previous holder of an "oil prospecting license" on the same area or on an area adjoining that of an "oil mining lease" previously held by the applicant. The minimum size of the lease is four square miles; the maximum size is 100 square miles (unless special permission is received from the governor). The area covered may include several separate but geologically related areas. Boundaries of the lease must be straight lines or easily definable points. The length of the lease must fall between three and five times the average width, depending on size. Lease duration is 30 years, renewable for another period not exceeding 30 years.

Fiscal obligations of the lease include an application fee of 150 British Honduras dollars, an annual rent, and a royalty. The annual rent is payable per acre in British Honduras dollars (here abbreviated to BH $) as follows: first through third years, BH $0.25; fourth year, BH $0.35; fifth year, BH $0.50; sixth year, BH $0.60; seventh year, BH $0.75; eighth year, BH $1.00; ninth year, BH $1.25; tenth and following years, BH $1.50. In terms of US currency, these range from 17.5 US cents per acre in the first and third years to US $1.05 per acre in the tenth and following years. The annual rents are deductible from royalties paid in the same year.

The royalty scale is 12½% on the value of crude oil produced. On natural gasoline produced, it is 10% up to two Imperial gallons per thousand cubic feet and 12½% thereafter. On natural gas it is 0.04 British Honduras dollars per thousand cubic feet, one-half that amount if gas is sold for repressuring. The lease contains, in addition, a clause which provides for "periodic revision" of royalties, although this phrase is not defined.

NATIONAL FACTORS

The general operating climate of British Honduras, as influenced by national factors, appears to be favorable. The petroleum legislation is generally liberal as regards royalty rates, rentals, and area of oil rights. The government of British Honduras is strongly influenced by Britain, although economically the country is closely tied by trade to the United States. British administration through an appointed governor has resulted in long-term stability, interrupted only slightly by claims of Guatemala to the area of "Belize" as British Honduras is there called, and Mexican claims to part of the northern area. The attitude of the government is favorable to the development of petroleum in British Honduras, although foreign private capital is subject to the right of "reciprocity" earlier outlined.



Taxation is higher than generally found in Central America. The income tax, which is the principal levy, begins at 34% on company income up to 100,000 British Honduras dollars, rising to 37½% on the next 100,000 and 40% thereafter. However, by Statutory Instruments No. 53 and 54 of 1949, enterprises contributing to development may be given exemption from import duties and income tax with consent of the governor.

Other aspects which reflect less favorably on investment opportunity include the small size of the country. Total area is only 8,598 square miles—about 174 miles long and 68 miles wide—with a population of around 70,500. The terrain, which is low and swampy, with a tropical climate on the coast and ascending inland to several thousand feet, would constitute an exploration difficulty, especially with the limited transportation facilities which total only about 500 miles of passable road.

As a final factor, there must be added the element of exchange control. The British Honduras dollar was formerly on a par with the US dollar, but now is linked with the British pound and has, at present, a value of 70 US cents. The regulations governing the transfer of capital and profits into US dollars are essentially those of the sterling area. While presently not rigorous, they are subject to change on reduced dollar availabilities. END

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BURMA

Exploration

Burma's crude-oil producing fields, first developed more than 50 years ago, are concentrated in the Chauk-Lanywa area more than 300 miles north of Rangoon. Because of continued insurgent activity along the pipeline route, production is limited to the requirements of local refining capacity. At this level, production is far below the prewar rate (over 20,000 b/d) when Burma exported the bulk of its oil.

Table I—BURMESE CRUDE PRODUCTION—1956
(Thousands of Barrels Per Day)

January	4.7	July	5.2*
February	4.5	August	5.3*
March	4.1	September	5.3*
April	4.2*	October	5.5*
May	4.5*	November	5.3*
June	5.2*	December	5.3*
*Estimate		Year	4.9*

Operations have been in the hands of Burmah Oil Co. Ltd. with which two smaller British companies, British-Burmah Petroleum Co. and Indo-Burma Petroleum Co., merged their interests at the end of World War II. (Burmah Oil Co. holds a 76.8% interest in the combined operations of the group, which are carried out through a nonprofit subsidiary.) Recently, however, the three companies entered into an agreement with the government of Burma for the joint development of the industry.

Operations during 1956 and 1955 were confined to development drilling and reconditioning of wells in the Chauk and Lanywa fields of central Burma, with a view to building up the field potential. It is expected that eventually the old fields of central Burma may be able to produce about 10,000 bbl of crude oil per day, enough to meet domestic demand and to allow export of some oil. The prewar production from these fields averaged 21,500 b/d.

Oil Production in Burma (US Barrels)

Field	Company	*Daily Average*	
		1954	*1955*
Chauk and Lanywa	BOC	4,250	3,280
Yenangyaung (produced locally)			830
Total		4,250	4,110

Wells have been drilled in Burma, ranging in depth from a few hundred feet to 6,500 ft. About 90% of total production is derived from Chauk, Lanywa, and Yenangyaung fields of central Burma.

Burma Oil Co. (1954) Ltd. recently announced it will drill the first wildcat in Burma since before World War II, after extensive preliminary work, including the construction of an approach road and a camp. The well, which may go to 10,000 ft, will be located in Magwe district on the Ondwe structure, a well-developed dome on the same axis of uplift as Yenangyaung field about 30 miles northwest. The horizons which are productive in Yenangyaung are expected to be found at a much greater depth in a new test.

Refining

Present efforts are directed toward meeting demands of the reconditioned refinery at Syriam, near Rangoon. The refinery will be operated by the Burma Oil Co. (1954) Ltd., which is now owned one-third by the Burma government and two-thirds by the old Burmah Oil Co. Ltd. and its affiliates. Rehabilitation of the refinery was scheduled for the latter part of 1956. Capacity will be 3,500 b/d.

There are two other refineries in the country. One is operated by the Burma Oil Co (1954) Ltd., and is located at Chauk. It has 3,000 b/d skimming capacity. The other is owned by Nathsingh Oil Co. Ltd., at Yenangyaung. It also has 3,000 b/d skimming capacity. Neither plant has cracking facilities.

Refinery runs in 1955 were 4,400 b/d.

Marketing

Consumption in Burma is small, having averaged about 5,520 b/d during 1955. It is expected to rise to 8,280 b/d by 1960.

OIL LAWS

Aside from a constitutional provision in Burma requiring all companies to be owned 60% by Burmese nationals, the principal governing legislation is the "joint venture agreement," recently concluded. This is an arrangement for cooperative industry-government operation of the Burmese oil industry which was first proposed by the government in 1951. A draft agreement, granting the government a one-third interest in a proposed new local company, was initiated at the end of that year The Burmese government, however, had to deal with the legal question of whether it could enter into an agreement providing for only a one-third participation, in view of the constitutional provision requirng that 60% of the shareholders be Burmese nationals. This requirement was waived by special legislation, and early in 1953 the country's supreme court declared the arrangement constitutional.

The agreement, as signed on January 12, 1954, established a new joint company, to be known as "Burma Oil Co. 1954 Ltd." The new company has taken over all existing production and refining facilities in the country, but distribution assets are not included at this time. The agreement gives the government the right to increase its participation when and if desired, and there is little doubt that the government aims ultimately at complete nationalization of the industry. The government now has 50% and the option of buying the remaining 50% on payment of a specified sum in sterling.

The immediate aim of the new jointly owned company is to achieve the country's self-sufficiency in refined products, and to restore the refinery at Syriam (near Rangoon) and to reattain an export surplus of refined products at a later date. Presently known crude reserves, estimated at 45 million barrels, are believed to be adequate to support operations at a level of 10,000 b/d for 10 to 15 years.

NATIONAL FACTORS

The only economic activities closed to private foreign investors are major public utilities and munitions manufacture. Enterprises for the extraction of natural resources may be conducted by private enterprise in partnership with, or under contract to, the government. The Ministry of Mines indicated that favorable consideration might be given also to investment proposals for joint-venture operations between foreign and Burmese private interests.

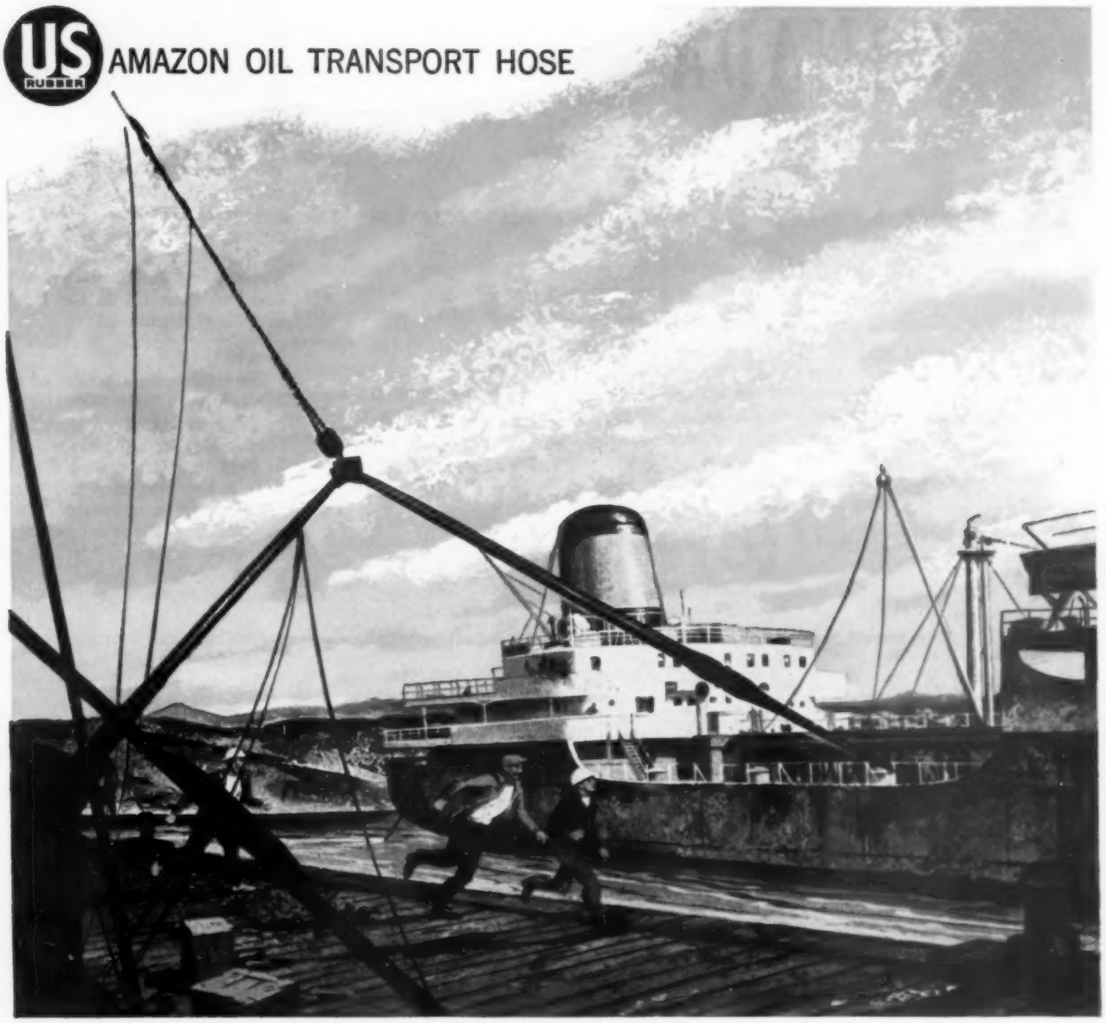
The constitution provides that industries or single enterprises may be nationalized or acquired by the State, and the government nationalized several British and Indian processing and distributive enterprises in 1950. In some instances compensation received was considered reasonable, but several cases are still pending. No major nationalization action has been undertaken since early 1954, and none is known to be contemplated.

The Specific Companies Act was passed in 1954 to permit the government to enter into a flexible agreement for the acquisition initially of a minority interest in the petroleum production and refining operations of the British-owned Burma Oil Co. Burmese regulations permit the government to grant mineral-resources exploitation rights in exceptional circumstances to foreign-owned companies, although the constitution originally restricted the granting of such concessions to Burmese citizens or Burmese-controlled companies. The acquisition of majority control in mineral development concessions by foreigners or foreign-controlled companies was made possible by the Minerals Resources (Grant of Right of Exploitation) Enabling Act (1949).

The government is now re-examing its basic mineral laws and mining regulations to encourage further exploration and exploitation of the country's mineral resources. Revision of both the Minerals Concessions Rules and the Petroleum Concessions Rules is contemplated.

END

US RUBBER AMAZON OIL TRANSPORT HOSE



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As the heavy, sluggish tanker edged further out, tremendous strain began to build up on the two hose, each consisting of two 25-foot lengths. *But U. S. Amazon Hose held.*

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But U. S. Amazon Hose held—

When the tanker was brought back to the pier, astounded engineers removed the hose and tested it to 200 lbs. pressure. No leakage or other damage was found. Most amazing of all, each of these stretched and strained lengths recovered all but one foot of its original length.

This totally unexpected use of U. S. Amazon Hose as a hawser is a dramatic example of the value of "U. S." wire cord construction—which can take more longitudinal abuse or other deformations than conventional woven duck hose.

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CANADA

Exploration

Canada achieved major exploratory importance in 1947 when Imperial Oil found the Leduc field in Alberta, western Canada. Subsequent work by many companies resulted in a series of finds, including Redwater field, Bonnie Glen, Golden Spike, Acheson, Wizard Lake, and Pembina. The latter was found by Socony Mobil, and is now the largest of all Canadian fields. It was the last major discovery in Canada.

During 1956 exploration continued a steady rise in western Canada. The total of wells drilled was up 12%, to 2,382, during the first 9 months. Exploratory wells declined slightly, to 444, during the same period—but development wells were up to 1,938. Alberta increased exploratory drilling by one well, to 229, as against 228 in 1955, but the other provinces declined somewhat. The discovery ratio was highest in Alberta, where about one oil or gas well was found for every 3½ dry holes. Saskatchewan had a discovery ratio of about one in four, but in the southeast the ratio was considerably higher, with 22 discoveries in 48 tests—which brought a concentration of 40% of western Canada's drilling rigs to the area.

Production

Canadian production began in 1862, but did not assume major proportions until after the Leduc exploration discovery in 1947. Less than 1,000 b/d comes from the eastern provinces of Ontario and New Brunswick. The remainder is from western Canada, principally Alberta. Of Alberta's output, 50% is from the Redwater and Leduc-Woodbend fields—although the Pembina field is rising rapidly.

The 1956 levels of production were below productive capacity of Canada because of the difficulty of transporting the crude to consuming centers. Total productive capacity was estimated, as of January 1956, at 46% higher than production levels at that time.

Production during 1956 is estimated at 456,000 b/d, compared with 354,400 b/d attained during 1955.

Reserves

Crude reserves in Canada are estimated by the Canadian Petroleum Assn. at 2,510 billion barrels as of the end of 1955. Of this amount, Alberta and British Columbia had approximately 2,169,985,000 bbl; Saskatchewan had 236,872,000 bbl; Manitoba had 45,211,000 bbl; the Northwest Territories, 53,707,000 bbl; and Ontario and New Brunswick, 3,759,000 bbl. This is a total of 2,505,775,000 bbl for western Canada, and only 3,759,000 bbl for eastern Canada. These estimates do not include the very large reserves of the Athabaska oil sands of Alberta, which are estimated to contain over 300 billion barrels, but have not yet proved economically feasible because of the difficulty of separating the oil from the sands. Experiments in this direction are under way by the Canadian government and several oil companies.

Transportation

There are two major pipelines. The largest is the Interprovincial Pipeline. This line, varying from 20 in. to 16 in. in diameter, runs from Edmonton, Alberta, to Superior, Wis., on the western end of the Great Lakes in the United States. The crude is transported from Superior to Sarnia, Ontario, for refining for the Ontario market. Capacities of the line are 217,000 b/d from Edmonton to Regina; 193,000 b/d from Regina to Gretna; 163,000 b/d from Gretna to Superior; and 147,000 b/d from Superior to Sarnia. Total runs during 1955 were 220,548 b/d. During 1956 the line reportedly was to be extended from Sarnia to Toronto.

The second major line is the Trans Mountain Pipeline from Edmonton to British Columbia, a distance of 718 miles. This line is 24 in. in diameter; has an initial capacity of 120,000 b/d and, with additional pumping stations, can transport 300,000 b/d. 1955 runs were 82,192 b/d. A pumping station installed during 1956 raised capacity to about 150,000 b/d.

A US Army line for products from Haines to Fairbanks, Alaska, traverses part of British Columbia. The length of the line is 615 miles. Diameter is 8 in. It was placed in operation during September, 1955.

There are two gas pipelines constructing. The largest is by the Trans-Canada Pipe Lines Ltd., backed by Clint Murchison of Texas. Plans call for a 36-in. pipe line from Alberta to Winnipeg and, from Winnipeg, a 24-in. lateral southward to Minnesota, with a 30-in. line to extend eastward to Ontario and Quebec. Planned capacity of this line is 540 million cubic feet daily, which is to be drawn from a wide network of feeder lines within Alberta, costing about US $300 million.

The other line is by Westcoast Transmission Co., which is building a line 650 miles from Peace River in north British Columbia to the United States.

During 1956, based on the first nine months, construction of oil and gas pipelines was 3,100 miles. Westcoast Transmission completed about 500 miles out of its 649-mile line to the United States. Trans-Canada, dogged by persistent opposition to importing its gas into the United States by US gas companies and a shortage of steel, went ahead with government aid and built an all-Canada line about one-third the way to Winnepeg. Another line completed was the Westspur Pipe Line Co.'s line from southeastern Saskatchewan fields to the Interprovincial system at Cromer, Manitoba. The Interprovincial line itself was becoming inadequate, and plans are reportedly under foot to parallel it with another line. Its deliveries during the first half of 1956 were up to 258,558 b/d, compared with 194,613 in 1955. Trans-Mountain Oil Pipe Line delivered 102,000 b/d during the first half, and Pembina Pipe Line Ltd. exceeded 100,000 b/d.

Other projects completed in 1956 included the Cremona Pipe Lines Ltd. line to Calgary refineries from the Sundre-Westward Ho Harmattan-Elkton group of fields. Peace River Oil Pipe Line completed its 16- and 12-in. lines from Sturgeon Lake to Edmonton. Large gas systems were under way by Saskatchewan Power Corp.; and in British Columbia the Inland Natural Gas Co. Ltd., a subsidiary of Westcoast, is completing a large internal distribution system, to be finished at the same time as Westcoast's line.

Refining

Total Canadian refining capacity, as of July 1956, was 644,850 b/d. Construction raised capacity to 670,000 b/d at the end of 1956, after retirement of obsolete stills. Of this capacity, approximately 31% is located in Quebec, 22% in Ontario, 14% in Alberta, 11% in British Columbia, 5% in Manitoba, 4% in Nova Scotia, and less than 1% in the Northwest Territories and New Brunswick.

Marketing

Domestic consumption of petroleum in Canada has risen from 38,093.000 bbl, or 104,364 b/d in 1929 to approximately 555,000 b/d in 1954. It rose 11% in 1955, to 638,445 b/d. The increase in 1956 was just under 8%, to around 684,000 b/d. A 6% rise in gasoline and a 14% rise in distillates are expected, with other products continuing moderate.

Canada is the third largest oil consumer in the world, and the second largest in the Western Hemisphere. On a per-capita basis, annual consumption of oil is second only to the United States. The rate of increase in consumption, however, is much higher than in the United States. Chief factors in the recent rapid increase have been in the rapid growth of the economy, plus the weather—which, with long and severe winters, necessitates high consumption for fuel alone, whereas the size of the country tends to smooth out abnormalities, balancing warm weather with cool in another part, etc., and reducing seasonal fluctuations in consumption. Demand for distillate is growing rapidly—expected to equal that for motor gasoline and to be more than twice heavy fuel-oil demand in 1960. By that year total demand will be around 850,000 b/d, according to industry estimates.

Total imports during 1955 were 341,094 b/d, composed of 238,127 b/d of crude imports and the remainder of product imports. Crude imports are restricted to the Quebec and Atlantic provinces, which are primarily dependent on imports because of transportation difficulties from western Canada.

Total exports of crude and products from Canada during 1955 were 43,881 b/d, according to dominion statistics. Almost all exports go to the United States. Industry sources estimate exports averaged 130,000 b/d during 1956. If these exports are included in demand, 1956 demand was in excess of 800,000 b/d, approximately a 20% increase, and is expected to rise even faster in the future. Exports to the US West Coast in 1956 averaged about 77,000 b/d, and exports to US refineries via pipeline to the north central states were about 50,000 b/d.

OIL LAWS

There are three separate regulatory systems governing subsoil rights and access thereto in Canada. Originally the dominion (federal) government owned the rights to all petroleum as representative of the British crown. Certain grants were made to private parties covering both the surface and subsoil ownership, especially to the Canadian Pacific Railway and the Hudson's Bay Co. After 1887 no further grants of subsoil (mineral) rights were made to private individuals on the sales of government lands, these being reserved to the dominion (federal government), with "full power to work, enter and use said lands."

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TABLE I—CANADIAN REFINERIES
(Data as of July, 1956)

Name of Company	Plant Location	Crude Capacity	Type Plant	Cracking Capacity
Anglo-Canadian Oil Ltd.	Brandon, Manitoba [1]	3,100	SC	1,225T
Anglo-American Exp. Ltd.	Hartell, Alta. [2]	4,000	SC	1,500T
Bonnyville Oil Refineries	Bonnyville, Alta.	1,000	S	—
British American Oil Co. Ltd.	Calgary, Alta. [3]	7,200	SC	2,500T
	Edmonton, Alta. [4]	7,000	SC	3,400TC
	Moose Jaw, Sask.	15,000	SCA	6,000TC
	Clarkson, Ont. [5]	21,500	Comp.	15,000TC
	Montreal, Queb. [6]	40,500	SCA	19,250OTC
Canadian Oil Refineries Ltd.	Sarnia, Ont. [7]	25,000	SC	10,000C
Canadian Petrofina	Montreal, Queb. [8]	20,000	Comp.	16,000C
Consumer's Co-operative Ref.	Regina, Sask.	13,000	SCA	6,200TC
Excelsior Refineries Ltd.	Lloydminster, Alta.	2,000	SA	—
Husky Oil & Ref. Ltd.	Lloydminster, Alta.	8,500	SA	—
	Ft. Williams, Ont. [9]	4,000	SA	—
	Moose Jaw, Sask. [10]	3,000	SA	—
Imperial Oil Limited	Montreal, Que. [11]	65,000	SCA	19,500TC
	Halifax, N.S. [12]	18,000	Comp.	70,000TC
	Sarnia, Ont. [13]	78,000	Comp.	23,300TC
	Winnipeg, Man. [14]	13,000	SCA	4,100C
	Regina, Sask. [15]	22,500	SCA	12,550TC
	Edmonton, Alta. [16]	25,000	Comp.	16,900TC
	Calgary, Alta.	9,200	SCA	4,600T
	Vancouver, B.C.	23,000	SCA	7,650C
	Norman Wells, NWT	1,250	S	—
McColl-Frontenac Oil Co. Ltd.	Montreal East, Que. [17]	43,000	SC	20,200TC
	Edmonton, Alta. [18]	11,000	SC	5,600TC
New Brunswick Oilfields Ltd.	Weldon, N.B.	300	S	—
Northern Petroleum Corp. Ltd.	Kamsack, Sask.	800	S	—
North Star Oil Ltd.	St. Boniface, Man. [19]	12,000	SC	5,100C
	Grand Prairie, Alta.	2,500	SC	1,100T
Prince Albert Refineries Ltd.	Prince Albert, Sask.	1,000	S	—
Petroleum Fuels Ltd.	Moose Jaw, Sask.	1,000	S	—
Royalite Products Ltd.	Kamloops, B.C. [20]	5,000	SA	—
	Coleville, Sask.	5,000	SA	—
Radio Oil Refineries Ltd.	East Kildonan, Man. [21]	2,000	S	—
Royalite-Hiway Ltd. (Royalite Oil Co.)	Saskatoon, Sask.	6,500	SCA	7,600C
Shell Oil Co. of Canada Ltd.	Shellburn, B.C. [22]	20,000	Comp.	10,100TC
	Montreal East [23]	55,000	Comp.	28,500TC
Standard Oil Co. of B.C. Ltd.	N. Burnaby, B.C. [24]	16,000	SC	9,000C
Sun Oil Co.	Sarnia, Ont. [25]	15,000	SC	11,000C
Regent Refining (Canada)	Port Credit, Ont. [26]	14,000	SC	4,000T
Wainwright Refineries Ltd.	Wainwright, Alta.	3,000	S	—
XL Refineries	Dawson Creek, B.C.	2,000	SC	—

S—Skimming; C—Cracking; L—Lubricating; A—Asphalt; Comp.—Complete. Under "cracking capacity," to indicate type: T—Thermal; C—Catalytic.

[1] 1,200 b/d Platforming capacity.
[2] 1,000 b/d catalytic reforming capacity.
[3] 2,000 b/d catalytic reforming capacity.
[4] 1,400 b/d thermal cracking capacity and 2,000 b/d catalytic cracking capacity.
[5] 4,500 b/d thermal cracking capacity, 11,600 b/d catalytic cracking capacity, 2,000 b/sd catalytic reforming capacity. To increase capacity to 30,000 b/d and a 12,000 b/d desulfurization unit and a 10,250 b/d catalytic reformer under construction, complete 1957.
[6] 3,050 b/d thermal cracking capacity, 16,000 b/d catalytic cracking capacity and 13,000 b/d catalytic reforming capacity. A 15,500 b/d catalytic desulfurization unit under construction.
[7] 4,500 b/d Platforming capacity. To increase capacity to 30,000 b/d and catalytic cracking capacity to 13,000 b/d, complete January 1957.
[8] 3,600 b/d thermal reforming capacity.
[9] 1,000 b/d catalytic reforming capacity. To increase crude capacity, complete 1957.
[10] 650 b/d catalytic reforming capacity.
[11] 12,000 b/d thermal cracking capacity, 17,500 b/d catalytic cracking capacity and 4,200 b/d catalytic reforming capacity. To build a 8,000 b/d Powerformer, complete early 1957.
[12] To increase crude capacity to 45,000 b/d. Construction is to include largest fluid catalytic cracker unit in Canada.
[13] 4,000 b/d thermal cracking capacity, 19,300 b/d catalytic cracking capacity, 8,000 b/d catalytic reforming capacity. A 13,500 b/d Powerformer under construction, complete September 1956.
[14] 2,400 b/d catalytic gasoline capacity.
[15] 4,500 b/d thermal cracking capacity, 8,050 b/d catalytic cracking capacity and 3,100 b/d catalytic reforming capacity.
[16] 9,100 b/d thermal cracking capacity, 7,800 b/d catalytic cracking capacity and 2,000 b/d Powerforming capacity. To construct 35 m-pound wax plant, complete October 1956.
[17] 4,200 b/d thermal cracking capacity, 16,000 b/d catalytic cracking capacity, 4,500 b/d catalytic reforming capacity and 12,000 b/d Platforming capacity.
[18] 3,000 b/d thermal cracking capacity and 2,600 b/d catalytic cracking capacity. A 3,300 b/d Platformer under construction, November 1956 completion.
[19] 1,100 b/d thermal reforming capacity.
[20] 3,500 b/d Platforming capacity.
[21] Catalytic reformer under construction.
[22] 3,500 b/d thermal cracking capacity, 6,600 b/d catalytic cracking capacity, 1,700 b/d thermal reforming capacity, 3,800 b/d Platforming capacity. A 3,300 b/d Platformer under construction, complete August 1956.
[23] 9,000 b/d thermal cracking capacity, and 19,500 b/d catalytic cracking capacity. To increase crude capacity by 10,000 b/d also under construction a 6,600 b/d Platformer.
[24] 9,000 b/d catalytic cracking capacity and 2,750 b/d Platforming capacity.
[25] 3,000 b/d thermal reforming capacity. Storage to be raised to 650,000 barrels.
[26] 800 b/d thermal reforming capacity and 2,300 b/d Platforming capacity. To increase crude capacity to 20,000 b/d and to install 7,500 b/d catalytic cracker.

In 1930 all rights, including surface and subsoil, on dominion lands were turned over to the provinces, with the exception of areas covered by dominion parks, Indian reservations, and the Yukon and Northwest Territories. This transfer has made provincial law the most important, especially in Alberta where the greatest petroleum development has occurred.

ALBERTA: Of Alberta's total 163,382,000 acres, approximately 81%, or 132,620,070 acres, are subject to provincial law.

Petroleum operations are divided into two stages: an exploration "reservation," which includes drilling rights; and a "lease for development," which covers exploitation rights.

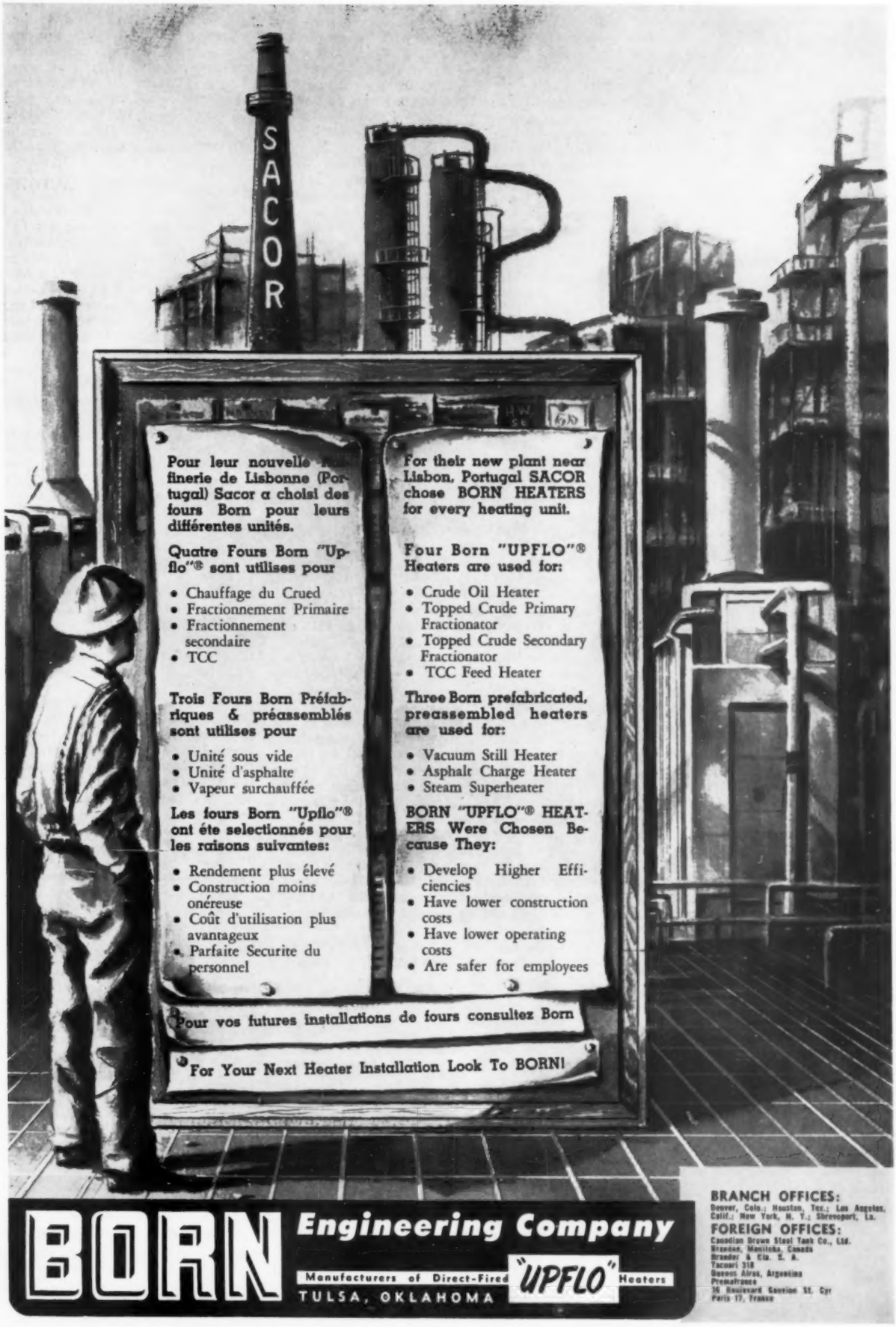
Administration is by the Department of Mines and Minerals, headed by the Minister of Mines and Minerals, in Edmonton. The province is divided into 2 mining districts, lying north and south of Township 42. The chief officer of each district is the mining recorder, and the districts are named Calgary and Edmonton.

Exploration: The exploration reservation for petroleum covers a maximum area of 100,000 acres. The number of reservations which may be held by one person or company is limited to two, but there is no prohibition against the creation of subsidiaries to hold more.

The original duration of the reservation for petroleum is only four months; however, through successive renewals, this is extended to a maximum of three years. One four-month renewal is given on evidence of the hiring of qualified personnel and indication of the date operations are to begin. A second four-month renewal is given when a "satisfactory" progress report and an expenditures estimate are given. These complete the first year. If operations are satisfactory, four additional renewal may be given of three months each upon payment by the operator at the time of granting of each renewal of a fee in cash for each acre comprising the reservation. This completes the second year. Where drilling is being conducted at the close of the final renewal and continues to the satisfaction of the minister, the reservation may be extended for further periods of three months each—not exceeding a total of four renewals—upon payment by the operator at the time of granting of each renewal of a fee per acre as specified in the next section. Further extensions may be given if necessary to complete drilling or if deemed necessary by the minister, subject to payment of a penalty therefor.

If the area is surrendered, the operator must furnish logs of wells drilled, maps of geological and geophysical data obtained, and such other information as specified by the minister. The operator is guaranteed the right to a development lease on 50% of the exploration area.

Fiscal obligations of the exploration reservation include an application fee of $250, plus a deposit of $2,500 for each 20,000 acres or portion thereof. The exploration surface tax is low originally and mounts rapidly. There is no tax during the first year. During the second year, which is composed of four renewals, a fee is payable on each renewal of seven cents per acre during the first and second renewals, and eight cents per acre during the third and fourth renewals. Following the second year there is, as previously covered, one more year provided for, comprised of four more renewals. This is contingent on continuous drilling. On each renewal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a further tax is payable of 10 cents, 15 cents, 20 cents, and 25 cents per acre, respectively. If drilling is not complete, two more renewals are possible at the 25-cents-per-acre rate. If further renewals are requested, they may be granted at the minister's discretion, but a penalty is payable. If, because of natural causes, the drilling program is held up beyond the end of the last regular renewal (the end of the three-year period), extensions are possible at a charge of 3 cents per month for each acre, plus a cash deposit of $7,500 for each 20,000 acres. This deposit is refunded if drilling is begun or the reservation is surrendered without conversion to a development lease. Up to 50% of exploration expenditures on drilling or geophysics may be credited to rentals later payable during the first year on a development lease which is taken out on the same area.

In the event of discovery of gas in a reservation area, a license to develop same may be applied for. The license fee is $250. Rental is 5 cents per acre, payable every 6 months. Duration of the license is 3 years, provided drilling is begun within 90 days of issue of the license and not more than 90 days elapse between completion or abandonment of one well and beginning of the next.

"Crown reserves" consist of the crown reserves created on application for a lease, plus 14 provincial reserves created in 1941 and other areas as covered below. Special regulations were established in 1954 for drilling reservations on crown reserves whereby the applicant would submit a request for the lands involved and indicate the objective zone and its depth. The area requested may then be advertised by the minister for offers. Cash offers are then received, and the successful bidder receives notice of sale indicating the zone and number of quarter sections to which he will be entitled to lease if his drilling is successful. Reservation fee is $250, and surface tax is 25 cents per acre, payable every 6 months. Duration is 3 years, provided drilling is begun within 90 days of issue and continued without interruptions of more than 90 days. On discovering oil, the holder is required to convert to lease, which is a complete lease and not confined just to the zone previously indicated on the license application.

Exploitation: Conversion of the exploration reservation area to a lease for exploitation of oil or gas is guaranteed for a maximum of 50% of the reservation area. Minimum area per lease is 160 acres; maximum is 5,760 acres if square, and 5,120 acres if rectangular. Duration of the lease is 21 years, and it is renewable for like periods so long as capable of production. There is no limitation on the number of leases which may be held by one person or company.

A drilling obligation on each lease requires a well to be begun within one year of date of issue, with leases not totaling more than 18 sections in the vicinity of the well able to be grouped for drilling purposes. When production is obtained, the lease on which it is located is segregated from the group. Drilling may not be discontinued for more than six months if a well is abandoned, or three months if completed as a producer (six months in the case of a gas well). These drilling requirements are not strictly enforced in times of shortage of drilling equipment. The drilling requirement may be petitioned for delay from year to year; otherwise default incurs cancellation of the lease.

Among the fiscal obligation of the lease is a royalty, payable monthly per well, and rising from 5% on up to 20 b/d to 12½% on 50 b/d production. From 50 to 60 b/d production the royalty is 12½%, increasing to a maximum of 16 2/3% at 135 b/d. These rates are set for 10 years from June 1, 1951, and will continue thereafter until changed by the lieutenant governor in council. A maximum is set of one-sixth (16 2/3%) during the first 21 years of the lease. The royalty on natural gas is 15% of the selling price, with a minimum of ¾ of 1 per cent per thousand cubic feet. Gas used in the field is deductible. Royalty on other fluid hydrocarbons is a flat 12½% of receipts.

Lease application fee is $10. Annual surface tax is $1.00 per acre, payable in advance. In the case of a lease of natural gas, the annual rental is 33 1/3 cents per acre, which may be reduced to 10 cents when an adequate market is not available.

An important aspect is the creation of crown reserves, which are subject to special cash bonus. These areas are comprised of (1) fractional areas of less than one-quarter section, (2) 14 provincial reserves created in 1941 of about 13,000 square miles total area, (3) in surveyed territory, acreage equal to the lease area applied for, which therefore limits leases to half of any township, (4) in unsurveyed territory, an area of equal acreage adjoining the lease. On creation of a lease, a reserve area is created (1) not less than one mile in width surrounding each location or concentration of leases, (2) the portions of a checkerboard pattern not permitted under lease (since lease blocks can only join at the corners), and (3) other areas the minister may select.

On crown reserve areas, leases are given in competitive bidding for cash bonus. The conditions of the reserve lease are identical with other leases except for the cash bonus. These areas may be opened to bid by the minister, but generally are opened on request of an interested bidder.

Conservation: Utilizing a system similar in some respects to that found in the United States, production during any month in Alberta is restricted in its upper limit to market demand as expressed in nominations for crude filed by various refiners or other recipients during the preceding month. The uppermost production limit of any well is its MPR (maximum production rate), as determined by a public formula, which represents the maximum rate of flow for the well, beyond which injury to the well's ultimate recovery expectancy would result.

NATIONAL FACTORS

Among the factors which have led to the influx of capital investment into Canadian petroleum are the stable governmental form, the large area of sedimentary terrain remaining to be explored, the proximity of potential production to markets in the United States, and other varied factors, such as the lack of exchange control. All values in this and previous discussion are given in Canadian dollars, but there is no restriction on capital movement and the US and Canadian dollar have remained nearly on a par.

There remain some less desirable aspects of importance to the petroleum industry. Among these may be listed the difficult topography and climate of the country, with consequent high operating costs; and the tax situation, with its attendant effects.

Income taxation on corporations in Canada is exclusively by the federal government. Rates are 49% on corporate income over $20,000. From this is deductible, by special provision which has been extended from year to year, exploration and drilling expenses incurred by any association, syndicate or exploration partnership engaged in oil exploration or drilling.

There is also deductible a depletion allowance of a flat 33 1/3% of net profits. This allowance is deducted, however, from net profits after first deducting all allowable expenses such as those incurred in exploration and drilling. There is no provision, as in the United States, for deduction on a cost basis or permission to deduct depletion from all income received, however derived. This arrangement reduces the value of the depletion allowance considerably and places the US investor at a considerable advantage over the Canadian, since the US investor or company has the advantage of recouping his costs from income at a faster rate. END

Table II—PHYSICAL PROPERTIES OF CANADIAN CRUDES

Crude	Gravity (Deg API)	Specific Gravity	Pour Point (Deg F)	Sulfur (% by Weight)	Saboylt Universal Viscosity at 100 F	Reid Vapor Pressure (Pounds)
Sailey	33.0	(0.8602)	—50	0.18	46	4.8
Steelman	37.1	(0.8393)	—40	0.88	39	7.9
Nottingham	38.1	(0.8343)	20	0.79	38	6.7
Alida	41.4	(0.8184)	—45	0.72	35	9.5
Fosterton	24.1	(0.9094)	5	2.66	142	3.2
Midale	27.9	(0.8877)	40	2.48	73	4.9
Virden	32.6	(0.8623)	—45	1.50	48	4.9
Redwater	34.7	(0.8514)	25	0.54	46	6.9
Excelsior	36.3	(0.8433)	20	0.63	46	5.8
Bon Accord	34.1	(0.8545)	10	0.63	46	2.1
Leduc	39.7	(0.8265)	5	0.28	39	9.1
Acheson	36.6	(0.8418)	10	0.29	43	6.3
Golden Spike	35.3	(0.8483)	25	0.17	44	—
Bonnie Glen	42.5	(0.8132)	25	0.24	37	10.8
Wizard Lake	37.2	(0.8388)	15	0.20	42	8.2
Pembina	37.0	(0.8398)	50	0.21	44	6.5
Sturgeon Lake	37.1	(0.8393)	— 5	0.42	39	5.8
Stettler	27.2	(0.8916)	10	1.87	75	6.7
Sundre	31.7	(0.8670)	— 5	0.72	47	6.0
Harmatton	36.6	(0.8418)	—25	0.49	39	5.8
Westward Ho	34.6	(0.8519)	—25	0.50	41	4.4

TABLE III—CANADIAN PRODUCTION BY PROVINCES
(BARRELS)

	1955	1954
Alberta	113,035,046	87,713,855
Saskatchewan	11,317,624	5,422,899
Manitoba	4,151,316	2,148,184
Ontario	524,945	412,474
Northwest Territories	411,046	369,887
New Brunswick	12,546	13,046
Total	129,452,523	96,080,345

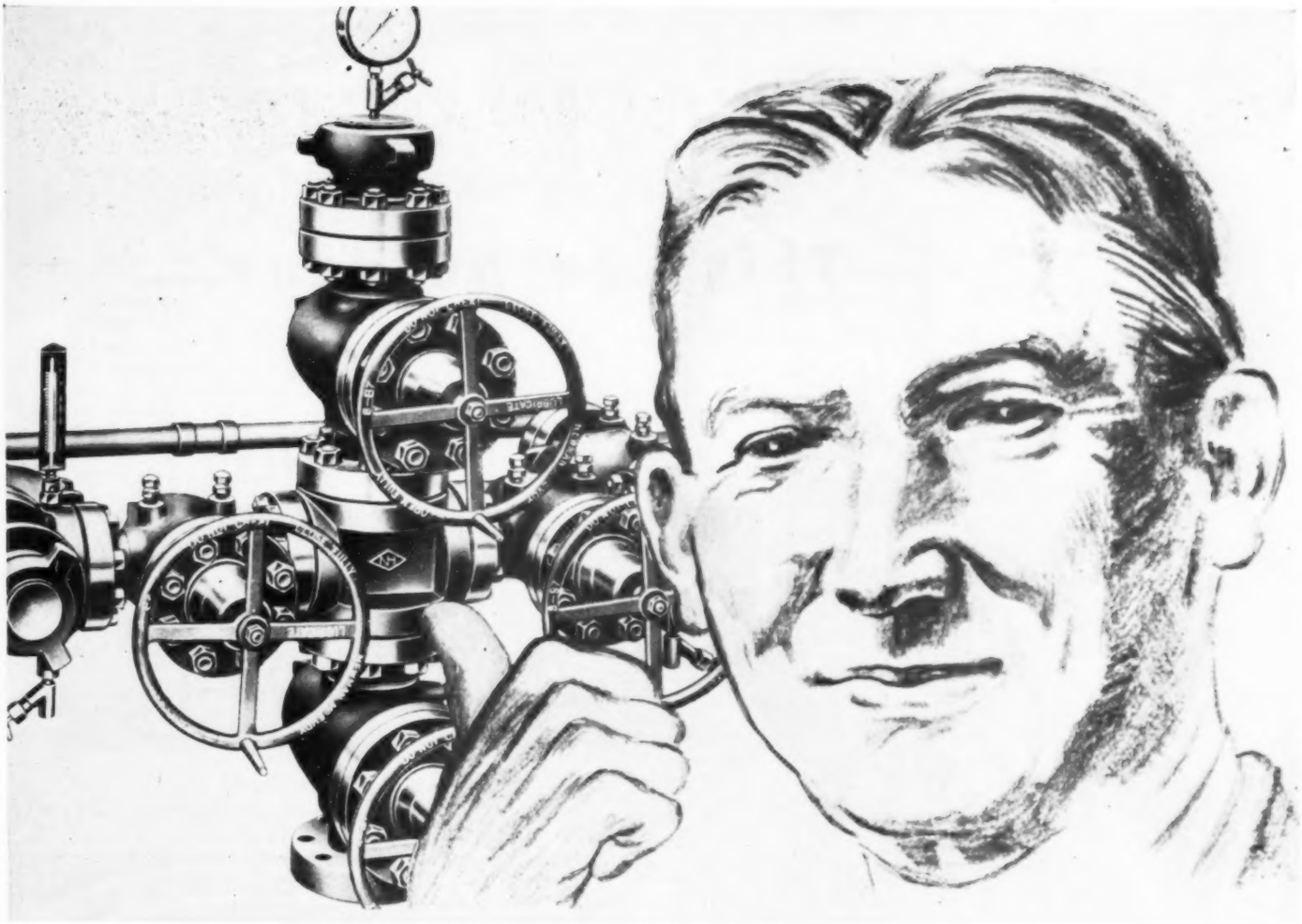
TABLE IV
CANADIAN CRUDE PRODUCTION—1956
(Thousands of Barrels Per Day)

January	438.8	July	399.6
February	466.8	August	388.0*
March	461.2	September	390.0*
April	395.9	October	391.0*
May	387.3	November	392.0*
June	421.8	December	392.1*
		Year	410.4*

*Estimate

TABLE V
DRILLING IN CANADA—9 MONTHS 1956

Province	Wells Drilled Wildcat	Development	Total
Alberta	229	1195	1424
Saskatchewan	176	566	742
Manitoba	30	150	180
British Columbia	9	27	36
Total	444	1938	2382



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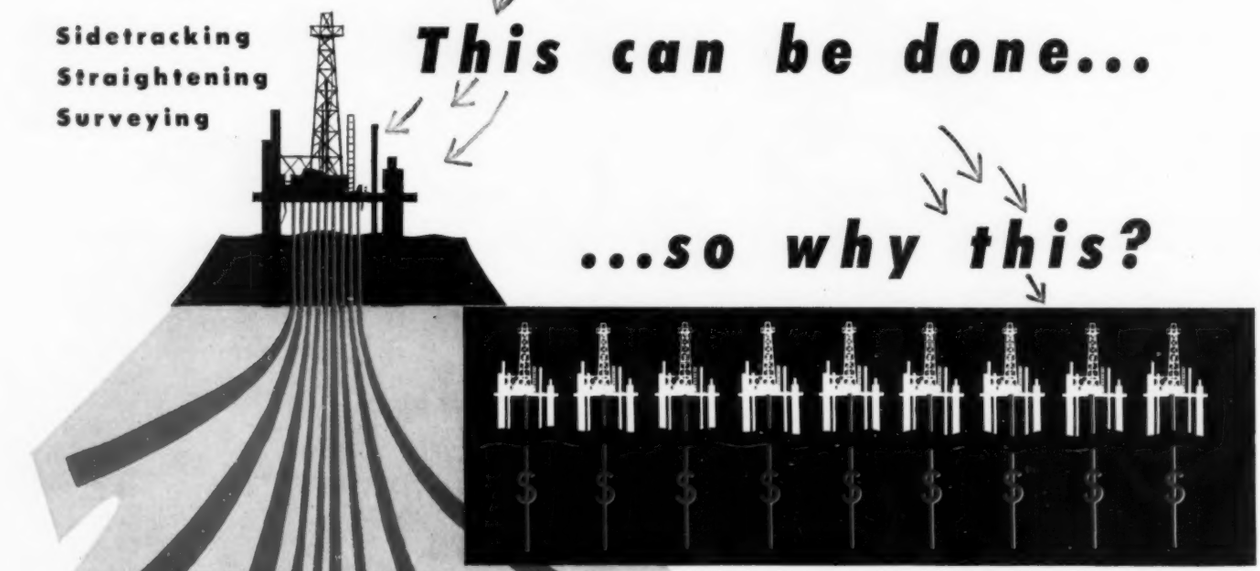

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CHILE

The petroleum industry of Chile constitutes one of the oldest government petroleum monopolies in the world, with no private companies permitted to hold concessions for development or exploration since 1926. The agency responsible for State petroleum activities is the Corporacion de Fomento de la Producion, since 1950 known as the Empresa Nacional del Petroleo (ENAP). There are no private concessions for oil exploration and development.

Exploration

ENAP's efforts have been concentrated in the productive Springhill sand trend along the eastern side of the Magallanes basin in the tip of southern Chile, the only producing site at present. A total of 10 fields is producing oil of 39 to 42 API gravity from the Cretaceous.

Four rigs were employed during late 1956, with Santa Fe Drilling Co. acting as drilling contractor.

During 1955, 58 wells were drilled, of which 15 were wildcats. Of the 58 wells, 25 were dry, 25 were oil producers, and 8 found gas.

Reserves as of January 1, 1956 were 25,000,000 bbl.

A total of 15 wells was completed during the second quarter, and a total of 32,231 meters was drilled, as follows:

Wells Completed in Chile
(2nd Quarter 1956)

	Oil	*Gas*	*Dry*	*Total*
Exploration	1	1	4	6
Extension	1	3	4	8
Production	-	-	1	1
	2	4	9	15

Detailed geologic work was done recently in the Ultima Esperanza area and in the central part of the island of Tierra del Fuego. A geological reconnaissance was made of the Aysen region (west of Comodoro Rivadavia province of Argentina).

Gravimetric work was conducted within the Magallanes basin, both on the continent and on the island of Tierra del Fuego. Seismic surveys were carried out in the region between Punta Catalina and San Sebastian, in Tierra del Fuego, and in the Punta Delgada region north of the Straits of Magellan.

During late 1956 ENAP began exploration in the northern province of Tarapaca, with a budget for the area of about $1.5 million. This is the first time ENAP has made a major move out of southern Chile, where four geologic, two gravity, and three seismic crews are working.

Production

Production of petroleum under government control has mounted, since its discovery in 1949, to about 3,447 b/d in 1953, 4,800 b/d in 1954, and 7,059 b/d in 1955. Production rose to 9,808 b/d in June of 1956, the increase due mainly to the development of the Cullen, Chillan, and Flamenco fields.

Production in the second quarter of 1956 was about 858,953 bbl, or 9,336 b/d. This was up 11% from the first quarter.

TABLE I
CHILEAN PRODUCTION BY FIELDS
(2nd Quarter 1956)

Property	Crude (Barrels)	Gas (Cubic Meters)	Gas Reinjection
Manantiales	21,735	32,541,000	38,103,000
Victoria Sur	118,247	15,556,000	9,343,000
Sombrero	235,267	13,824,000	12,486,000
Victoria Norte	16,999	13,893,000	
Chanarcillo	33,482	26,436,000	575,000
Chanarcillo Sur	13,742	11,487,000	
Victoria Este	44,132	10,399,000	
Chillan	140,852	1,619,000	
Cullen	174,103	3,557,000	
Flamenco	21,297	1,195,000	
Manantiales Sur	2,445	1,546,000	
Calafate	30,974	861,000	
Catalina	810	949,000	
Colondrina	4,848	61,000	
Total	858,953	133,924,000	60,507,000

Transportation

A products pipeline is being considered by the government. Private capital bids on a $1.5 million line from Concon to Santiago may be let in the future, either for private account or government construction.

TABLE II
CHILEAN CRUDE PRODUCTION—1956
(Thousands of Barrels Per Day)

January	7.4	July	9.9
February	8.8	August	10.2
March	9.2	September	10.3
April	9.2	October	10.5
May	7.3	November	10.6
June	9.8	December	10.4*
		Year	9.5*

*Estimate

TABLE III
CHILEAN OIL IMPORTS DURING 1955

Product Imports (Barrels)

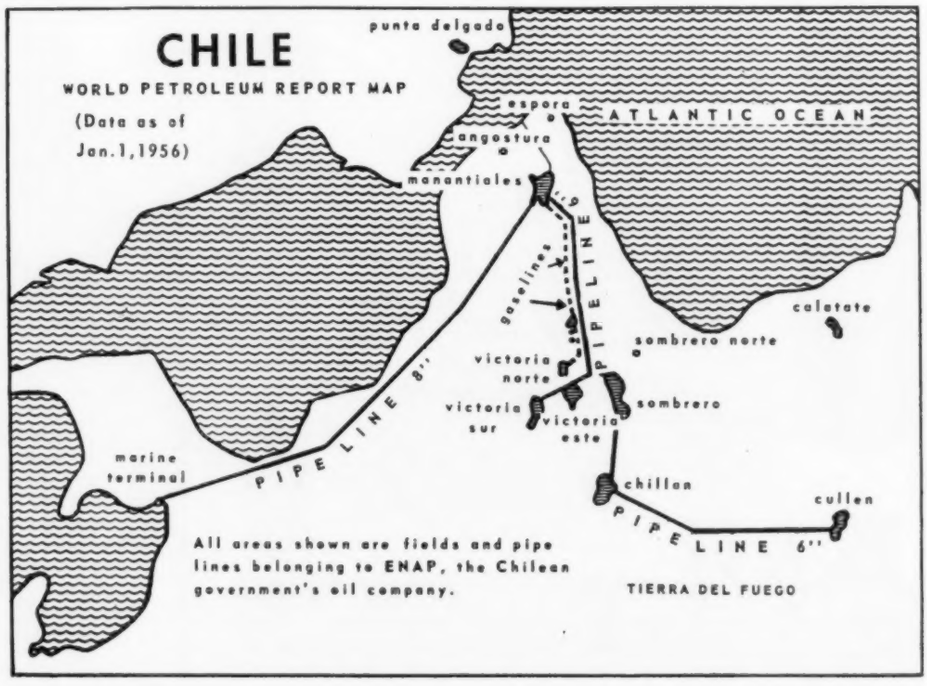
Crude oil	2,092,600	Grease	13,529
Kerosine	1,193,261	Asphalt	8,031
Gasoline	1,671,225	Varsol and solvent	33,101
Diesel	963,923	Waxes	20,294
Fuel oil	4,715,788	Vaseline	189
Lube oils	143,348		
		Total	10,855,289

By Country of Source—Product Imports

USA	2,320,561		
Peru	1,951,672	Arabia	137,261
Aruba	2,129,791	Holland	7,310
Curacao	1,356,775	India	2,893
Venezuela	2,934,998	Belgium	93
Bolivia	11,325	Germany	2,610
		Total	10,855,289

Marketing

Consumption during 1955 totaled about 39,000 b/d of crude equivalent. This was estimated to rise to around 42,000 b/d during 1956, and by 1960 to 55,000 b/d. It is mainly supplied by imports.



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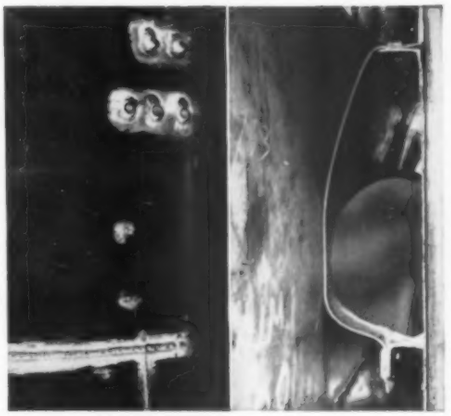
To determine the efficient life-expectancy of the Hammond Tubeseal in service, tests were made under the worst possible conditions to which a floating roof seal can be subjected. The Tubeseal was moved across very rough rivet heads, erection burrs and abrasive weld surfaces, for a total travel of 70,000 feet. This is equivalent to a normal wear of *more than 36 years in actual service.* Moreover, as the tests were run dry, there was the added disadvantage of the absence of lubricating effect normally created by wetted surfaces. Upon completion of these rigorous tests, the scuff band had only worn through the ribs and had barely penetrated through the material, leaving two-thirds of the stock intact; proof that the Tubeseal is unimpaired after traveling 70,000 feet.

The 36 year life-expectancy of a Hammond Tubeseal assumes no mechanical accident and is arrived at in the following manner: Each year a floating roof, in normal service, makes about 48 trips to and from top and bottom of tank. The roof of a 40 foot tank, therefore, will travel 1920 feet per year. Assuming 1920 feet of travel per year (based upon full depth of travel) and applying our accelerated wear test, the Tubeseal will be serviceable for at least 36 years 5½ months.



THE TUBESEAL TEST:

total travel	70,000 feet
travel over vertical weld	46,400 feet (on same line)
Horizontal welded seam crossed	21,200 times
Flat head rivets crossed	63,600 times

CONDITION OF TUBESEAL AFTER TEST: Scuff band had worn through ribs and had barely penetrated into the main material, leaving ⅔ of stock intact.

Tests were conducted dry with no aid of lubricant normally resulting from stored product.

Photos show projections used for test. Included are 16"of ⅜" horizontal weld—24" of sharp, irregular vertical weld—2 erection burrs—3 ¾" flat head rivets and 2 ¾" cone head rivets.

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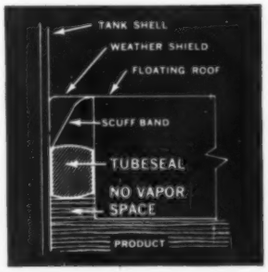

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Refining

A new refinery at Concon, 15 miles from Valparaiso, is run by ANCAP, a government agency. Total capacity is 20,000 b/d, with 6,300 b/d thermal cracking. Runs in 1955 averaged 12,230 b/d. Output was composed of 1,724,441 bbl of gasoline, 664,510 bbl of diesel oil, 137,839 bbl of kerosine, 1,290,794 bbl of fuel oil (No. 5), and 646,361 bbl of No. 6 fuel oil.

There are some small topping plants in the country which have only skimming capacity. One is owned by G. H. Johannsen, at Coquimbo, with 125 b/d capacity; another, at Talcahuano, owned by Miguel Maritano, has 60 b/d capacity; and a third, at Via del Mar, is owned by Soc. Establecimientos Quimicos, with 175 b/d capacity.

OIL LAWS

The present government monopoly in petroleum was established in 1926, when Law 4109 of December 23 made all petroleum deposits the property of the State, a provision which was repeated in the Mining Code of 1932—although deposits vested in private ownership by previous laws were excepted.

The controlling law at present is Law 4218 of February 15, 1928. This law reserves to the State all exploration rights in petroleum. The State is given a monopoly over refining, as well as distribution of petroleum products.

An attempt was made to liberalize Chile's petroleum legislation during 1954, a bill having been introduced by the Ministry of Mines to permit foreign investment in Chilean petroleum excepting lands now producing, which are still excluded. This bill, proposed on November 20, 1954, proposed to modify State ownership by permitting ENAP to enter into contracts with ". . . persons, national or foreign" through and with the consent of the president of Chile for the development and exploration of Chilean petroleum lands, (outside the Magallanes basin). It failed of approval, and another bill is now pending. At the end of 1956 this bill had not yet become law. It is reported to reserve the Tierra del Fuego, the only producing area at present, to the government's Empresa Nacional de Petroleo and to provide for concessions to foreign or national private companies in lots of 50,000 hectares (123,500 acres) each, with a maximum of 10 such lots per company. The 50-50 division-of-profits principle was understood to be incorporated in the law.

NATIONAL FACTORS

Petroleum investment in Chile during the present monopoly setup is an academic question. In addition to the monopoly, however, there are other factors which affect Chile's favorability, and would be important considerations if the proposed draft to permit foreign private participation in petroleum becomes law.

Chief among these is the history of governmental instability. There are at present some 36 political parties in Chile. To be added to this is a strong socialistic tendency in recent years, with a communist influence in labor unions of unusual proportions for Latin America—although, politically, the upheavals which have occurred occasionally have not seriously affected business operations within the country.

The value of the Chilean peso has deteriorated rapidly, with a rapid internal inflation. With the cost of living going up far too fast, the peso had fallen to approximately 498 per dollar in July 1956, selling and buying rates.

Mining income (which presumably would include petroleum income) pays a net income tax of 19.5%, although companies whose shareholders pay the dividend tax (given below) pay 11%. The dividend tax referred to is 19.5% on stock income, unless stock is to bearer, in which case this rate is doubled. On stock held by banks as nominees of undisclosed principals, a 300% surtax is added. A complementary tax is payable as a surtax, ranging from 7.7% on incomes between 50,000 and 60,000 pesos to 60% on incomes in excess of one million pesos. Foreign companies pay an additional tax of 16.9%. An excess-profits tax is levied on profits exceeding 15% of invested capital. It varies from 15.6% to 46.8%, and the balance of profits must be invested toward government obligations or improvements.

Other aspects of the Chilean scene are more encouraging. Although negotiations concerning increased taxes are now under way with the large mining companies on whom the country depends for much of its export earnings, the general attitude toward foreign investment is very liberal. This excludes, of course, the petroleum industry. The laws of Chile contain no discriminatory restrictions on foreign capital entering other businesses, and foreign companies are treated on an equal basis with domestic. A recent law, Decree 427 of November 1953, as amended by Decree 437 of February 4, 1954, facilitates foreign investment in Chile and provides for (1) capital repatriation and transfer of profits by quotas of 20% yearly for capital and complete repatriation of interest and profits for 10 years (or 20 years with presidential approval); (2) exemption from taxation for 10 years on new investments, also extendible to 20 years; (3) complete customs and other import exemption on new industries consuming 80% Chilean raw materials—although such industries do not qualify for the other benefits.

END

CHINA

Reserves

Proved reserves amount to approximately 700 million barrels, the greatest share of which is located in the Kansu corridor and in Tsinghai Province. The ultimate reserves of China's seven main basins, i.e., Dzungor, Tarim, Tsaidam, Shensi, Szechuan, and Tientsin, in addition to those of Kansu-Tsinghai, are very great. With three recent discoveries made at Urumchi, Karamai, and Wusu in Dzungaria, it may be presumed that this basin offers excellent prospects for a large production. In order of magnitude, it is followed by the Tarim basin, the oil riches of which have so far been only superficially prospected at several points along the Great Silk Road, which branches off from the Turfan depression and leads into Tadzhik.

Production

Communist China is the second important oil producer in the Soviet orbit following Romania. Its production compares with the pre-communist peak year as follows (in thousands of barrels):

1943	2,217.6
1949	871.2
1950	949.9
1951	1,606.2
1952	2,304.0
1953	3,398.4
1954	3,693.6
1955	4,802.4
1956	7,200.0

The main producing field is the Laochunmiao in the Kansu corridor, which yields more than half of China's current crude production. This field is located a few miles distant from Yumen, and drilling first was started here in 1939.

Planning

The main feature of China's Five-Year Plans is to attain self-sufficiency by the end of the third plan (1967). Oil deposits are being developed on a regional basis with a view to creating fuel-supply bases for projected industrial regions in the inland, and away from the eastern coastal areas. Owing to the modest investment rate which could be annually accumulated by this overwhelmingly agrarian country, the targets set for the Five-Year Plans are accordingly modest. The initial crude production goal set for the end of the first plan (1957) recently has been upped to 14.5 million barrels, but doubts about its fulfillment have been expressed even in official sources.

No spectacular developments may be expected before the completion of the planned transportation arteries, and the expansion of the processing plant capacity.

Among the former is the pipeline connecting Yumen to Lanchow, still under construction. The development of the Dzungarian deposits must await the completion of the railroad which was started in 1954 from Lanchow through the Kansu corridor, and which reached Ansi at the end of 1956. Not before 1960 will this line have crossed Dzungaria and reached the Soviet-Chinese border, wherefrom it will be connected to the Turk-Siberian railway at Aktogai.

Second obstacle restricting the expansion of crude production is the lack of processing capacity. The Yumen refinery recently was modernized and provided with a cracking unit which renders possible the processing of a longer line of products. The Urumchi topping plant is of local importance only, while the separating unit at Shanghai is too modest to alter the Chinese processing picture. When finished, the new plant under construction at Lanchow will become China's biggest refining center.

Crude production is restricted further by lack of equipment and materials. Steel output in 1956 was less than 4 million metric tons, which sufficed to cover only 80% of China's rationed steel consumption. Drilling equipment in the fields originates from the Soviet orbit—mainly from Russia, Romania, and Czechoslovakia. China's first drilling-equipment plant is under construction at Lanchow.

Consumption

Present domestic consumption is three times higher than actual crude production. The balance is covered by imports from Romania and Russia, carried by sea and overland transportation, respectively, as well as from irregular shipments from south Asian oil sources. A modest quantity of substitute liquid fuels (shale oil, methanol, and ethyl alcohol) is produced in Manchuria, and suffices to cover a fraction of East China's requirements. END

COLOMBIA

Exploration

The search for oil in Colombia dates from the beginning of this century, but it was not until some 20 years later that commercial production was started.

In view of a deficiency in local supply and requirements of the inland market, steps are being taken to increase refinery production, expand the industry's products pipeline network, and develop new crude-oil production. Since 1950 a number of laws have been passed liberalizing the system under which foreign companies must operate.

Under these revised regulations foreign interests have recently stepped up the search for new sources of crude oil, although this effort has thus far not yet been reflected in increased production.

Exploration activities increased about 20% during 1955 over the previous year. Most of the activity was confined to the North Coast basin and the middle Magdalena basin. Two new fields were discovered: Caipal, by Texas; and Lebrija, by Mobil Oil-Intercol. The majority of the exploratory drilling was conducted in the middle Magdalena basin and the North Coast basin.

In December 1955, Cities Service Oil Co. signed a development and exploration contract with the Colombian government's Empresa Colombiana de Petroleos covering about 2,200,000 million acres in the El Carare region, lying roughly between 6 to 7½ deg north latitude and 70 to 74¼ deg west longitude. This region is surrounded on three sides by the De Mares concession, one of Colombia's best producing areas which previously had been under litigation concerning title ownership. The arrangement calls for Cities Service's subsidiary to bear 75% of exploration costs and receive a like share of production. The remainder of costs and production will accrue to the government.

Forest Oil Corp., Bradford, Pa., recently signed a contract for secondary recovery by water injection in the De Mares field. The contract provides for 62.5% participation by Ecopetrol and 37.5% by Forest Oil. An 18-month period of pilot flooding is followed by 30 years of operation, with Forest's option for 10 years more. Each party puts up $4.5 million for costs; oil is split by percentage of interest after costs are paid. A minimum of 200 acres is to be developed the first year, and a minimum of 350 each year thereafter. The contract is confined to La Cira field, but may be extended to Infanta field between the fourth and sixth years.

John W. Mecom, an independent operator from Houston, Texas, recently concluded a contract covering about 500,000 acres in the vicinity of Tolu. Some offshore areas are included in the four concession areas contained. Preliminary reports indicate that Ecopetrol, the government's company, has retained a royalty interest of 5% and will supply 25% of the necessary capital. The remaining 75% of capital will be supplied by John W. Mecom interests.

Exploration during 1956 saw the entry of many new companies, following promulgation of a recent decree which has the effect of releasing large areas in Colombia on which applications have been made but no exploration contracts concluded. Such applications cover about 40 million acres at present.

During 1956 several important exploratory wells were begun. Empresa Colombiana de Petroleos spudded Quebrada Roja, a wildcat well in the northern area of the De Mares concession, which is now drilling. During November Colombian Petroleum Co. was drilling at 3,940 ft in No. 1 Esperanza in the Mercedes area south of its Barco concession, and Texas Petroleum Co. has a well going on the Caipal discovery north of its Velasquez field. One of the major discoveries during 1956 was Colpet's (Colombian Petroleum Co.'s) Cicudo discovery drilled to 8,115 ft, which tested initially about 300 b/d of 43 API crude. This brings a new area to the attention of explorers, on the coastal plain. Intercol (International Petroleum Co.) drilled Campeche No. 1, during late 1956, with Mobil Oil Co.

In November 1956 there were 8 exploratory wells and 15 development wells drilling.

Production

For almost 20 years crude-oil production in Colombia was limited to fields in the De Mares concession where commercial production was started in 1920. In 1939 the Barco concession entered commercial production, and in 1945 the Yondo concession began to produce crude oil in commercial quantities for the first time. Production from the older de Mares field in recent years has been well below the prewar level. The decline, however, has been more than offset by production from other areas, particularly the Barco and Yondo concessions. The other producing areas—Cantagallo, El Dificil, and Guaquaqui Teran—account for only a very minor part of total production. Recently the Velasquez field came on production and raised production to current levels.

Crude-oil production in the first 9 months of 1956 was 123,115 b/d, up 14% from 1955. The major increase came from Texas Petroleum's operations in the Guaquaqui field. There production was 19,374 b/d in the first half of 1956 (25,701 b/d in October) up from 9,774 b/d in the first half of 1955.

All important producing areas are located a considerable distance from the Caribbean seaboard. The De Barco concession is located in Santander, and connects with the coast near Cartagena via the 335-mile Andian Pipeline. The Barco concession, which is in the northeastern part of Colombia close to the Venezuelan boundary, is linked to the seaport of Cevenas by a 263-mile pipeline. Most of the other concessions are in the middle Magdalena River valley, ranging from the Guaquagui Teran fee property in the south—about 500 miles from the seaboard—to El Dificil in the north—about 100 miles from the coast. These concessions are connected with the Andian Pipeline of the De Mares concession.

The Yondo concession is now the largest producer in Colombia, and it is likely that the bulk of any further increases in the country's production from present producing areas will come from this concession. Some expansion is planned in the Guaquaqui Teran concession, which may boost production to a figure on the order of 25,000 b/d. In the case of all the other concessions (except Velasquez), no expansion is in sight. It is doubtful that production of the minor producers—Cantagallo and El Dificil—can even be maintained at the present very low levels. Indications are that the present rate of production in the Barco concession represents the peak rate for the area; in the case of De Mares, it is even expected that the yield will continue to decline. The National Petroleum Council of Colombia has estimated that output from De Mares will taper off to less than 10,000 b/d in 1962. On an overall basis, therefore, it may well be that future increases in Yondo, Velasquez, and Guaquaqui Teran may no more than offset the declining trend in other areas.

Between 1946 and 1956 the only outstanding commercial discoveries of oil were the Velasquez field, in the Guaquaqui Teran properties, by the Texas Co. in 1946, and the Tetuan field in Ortega, also by Texas.

Transportation

Since all producing fields in Colombia are located far from the coast, pipeline construction is important to petroleum development. Because of rough topography and frequent floods which destroy roads and bridges, distribution of petroleum products within the country is held up, and some sections depend upon product imports, especially the western coast.

There are four major crude pipelines in Colombia. The most important crude line runs from El Centro in De Mares concession to Mamonal on the Atlantic coast. It is 10 in. in diameter, except for one 34-mile stretch of 12 in., and has a capacity of 70,000 b/d. Owner is Andian National Corporation Ltd., an affiliate of Standard Oil (New Jersey). Two feeder lines, respectively of 50,000 and 8,000-12,000 b/d capacity, connect with Yondo and El Dificil concessions.

The second line is owned by South American Gulf Oil Co. (SAGOC), an affiliate of Socony Mobil and The Texas Co. It runs 263 miles from Petrolea field in the Barco concession to Covenas on the Atlantic near Cartagena, and has 28,000 b/d capacity, with a diameter of 12 in. Another line runs from Texas' Velasquez field to the Intercol's refinery at La Dorada with a capacity of 4,500 b/d, capable of being raised to 5,000 b/d with a pumping station added. It is of two loops, one 4-in. and one 6-in. Another line of 4-in. diameter runs from the Tetuan concession to a small topping plant at Guamo from Texas Co.'s Ortega field.

First-half 1956 pipeline runs were 129,904 b/d.

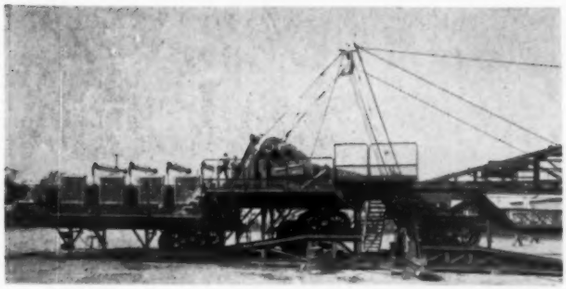
TABLE I—Crude Production in Colombia, 1955
(Barrels Per Day)

Company	Field	1955
Ecopetrol	San Luis	—
	Colorado	546
	Galan	2,448
	Infantas	8,037
	La Cira	19,802
		30,833
Colpet	Carbonera	88
	Petrolea	567
	Rio de Oro	1,948
	Sardinata	1,748
	Tibu-Tert.	16,856
	Tibu-Cret.	4,678
		25,885
Intercol	Buturama	97
	Totumal	26
	Caiman	21
		144
Shell	Cantagallo	2,342
	Casabe	35,137
	Dificil	1,415
	Yariqui	1,388
		40,282
Texas	Ortega	942
	Tetuan	147
	Velasquez	9,774
		10,863
Total Colombia		108,007

Table II—COLUMBIAN CRUDE PRODUCTION—1956
(Thousands of Barrels Per Day)

January	116.1*	July	120.0*
February	113.8	August	123.6
March	117.2	September	124.0*
April	120.0	October	124.1*
May	118.9	November	123.5*
June	119.0*	December	125.0*
		Year	120.4*

*Estimate.



PERU—Designed for Mid-Continent customer in Peru, this drawworks and Unit Rig 4-engine rig drive is Athey track-mounted for easy moving over difficult terrain.

CANADA—Unit Rig U-1220 drawworks and Mid-Continent 3AE swinging compound rigging up at Canadian location. Below—wintertime at Drayton Valley, Canada.

VENEZUELA—Barge above equipped by Mid-Continent for use on Lake Maracaibo. Below—U-1220 Unit Rig drawworks electric motor powered for Gulf off-shore location.

GULF COAST—Drilling tender serving Mid-Continent—equipped barge off Louisiana Coast. Equipment includes Unit Rig U-1220 drawworks, 3AE Rig Drive, Emsco D-700 pumps, and pump drive.

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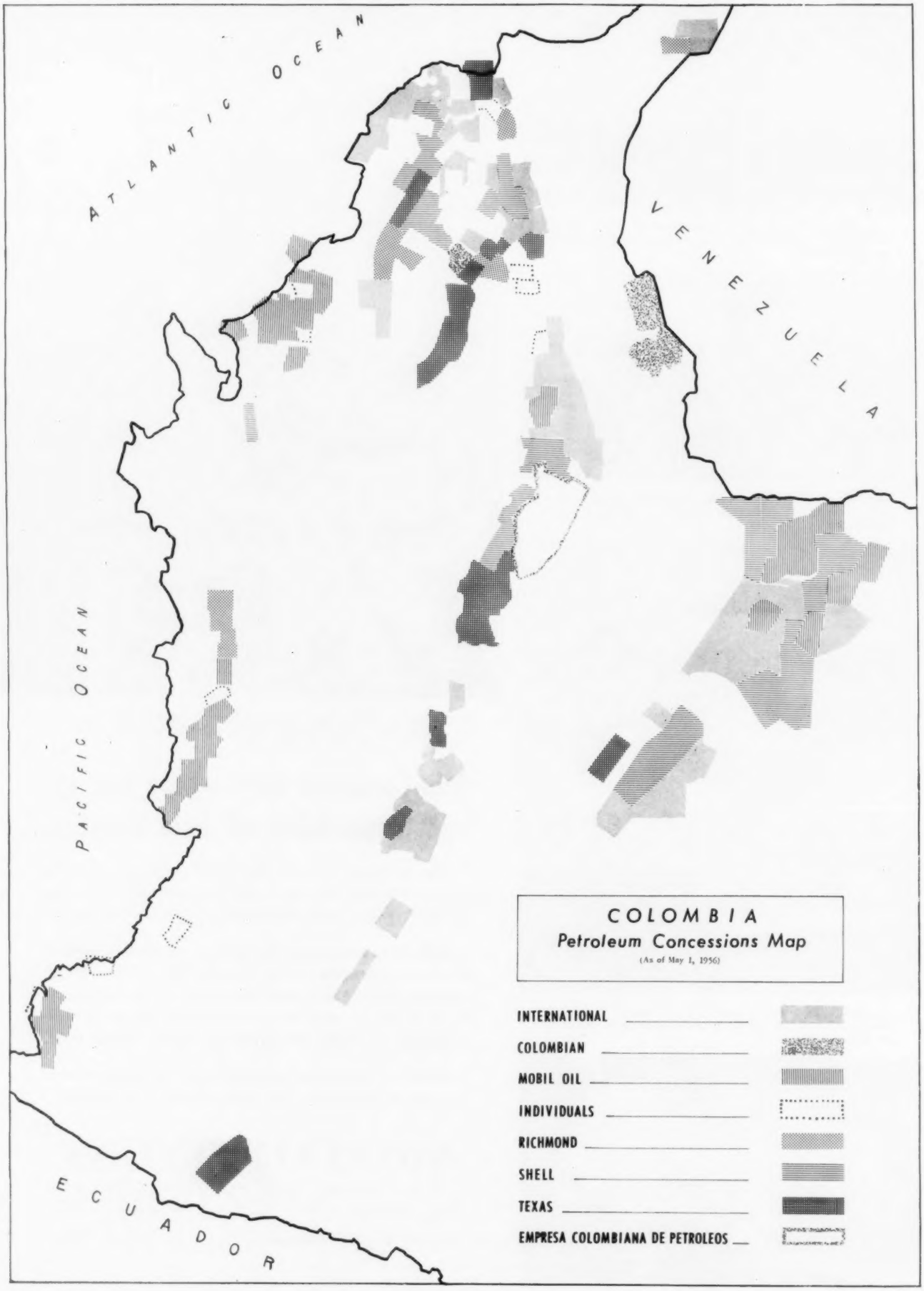
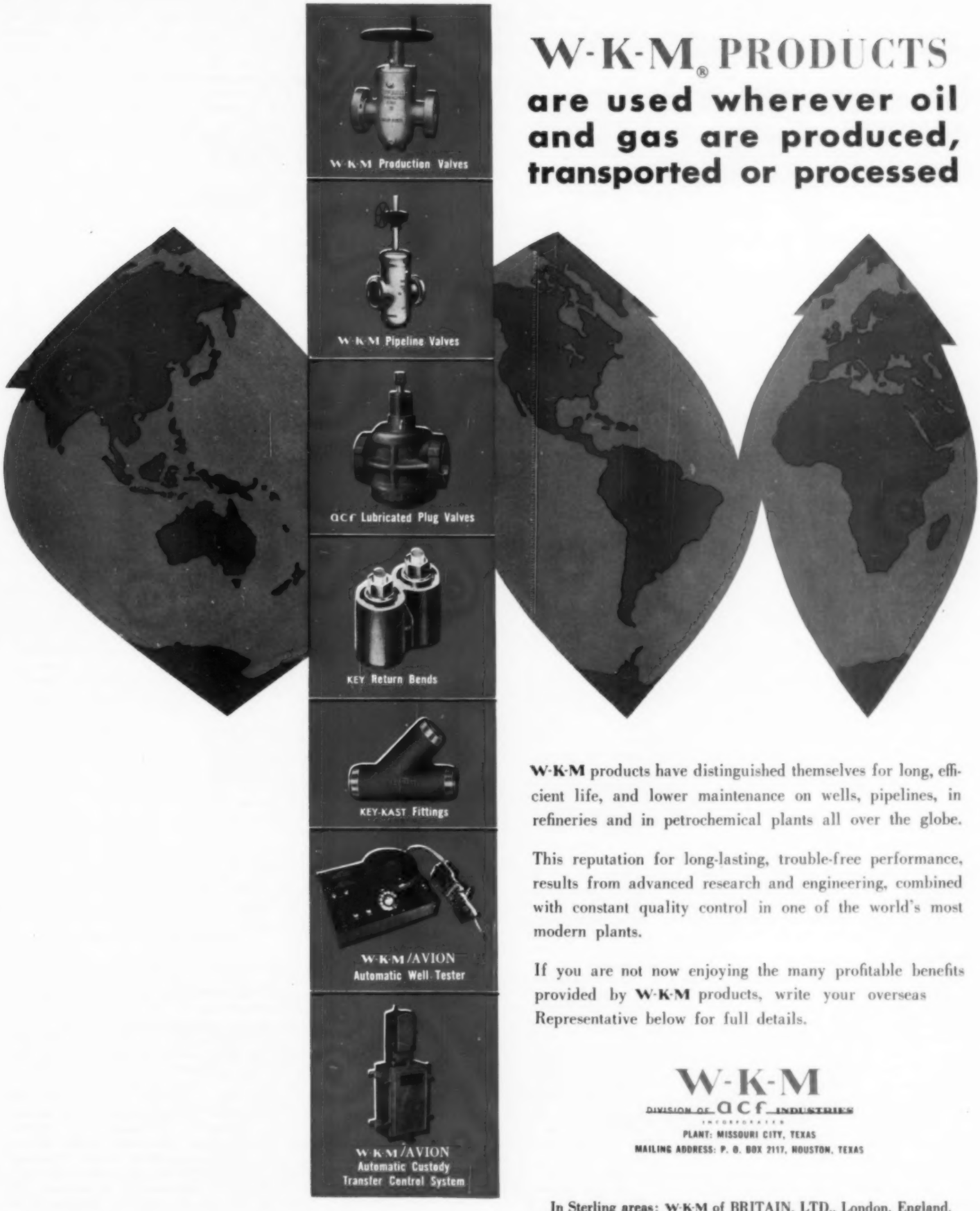

ATLANTIC OCEAN
VENEZUELA
PACIFIC OCEAN
ECUADOR
COLOMBIA
Petroleum Concessions Map
(As of May 1, 1956)
INTERNATIONAL
COLOMBIAN
MOBIL OIL
INDIVIDUALS
RICHMOND
SHELL
TEXAS
EMPRESA COLOMBIANA DE PETROLEOS



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During 1955 another major line came on with the 119-mile 30,000 b/d crude pipeline from the Velasquez field to Galan near the Barrancabemeja refinery. The 12-in. line will enable production from the Velasquez field which until now has been held down to a part of its capacity, because of transportation difficulties. This field is on the Teran-Guaquagui fee property owned by Texas Petroleum.

There are several other products pipelines in Colombia which help to alleviate the shortage of transportation for internal distribution. They go from Buenaventura on the Pacific to Cali, from Bogota to Barranca Bermeja, and from Medellin to Puerto Barrio, to mention the most important.

Refining

There are four refineries in Colombia with a total capacity of 46,500 b/d as of mid-1956, of which 31,630 b/d is cracking capacity. The largest refinery is owned by the Colombian government and located at Barranca Bermeja. It was formerly the property of the Tropical Oil Co., given to the government when that company's concession expired in 1951 and since operated by the International Petroleum Co. under contract. It has a total capacity of 37,500 b/d as of mid-1956, of which 31,630 b/d is cracking capacity. There is a second plant of 26,500 b/d capacity presently under construction at Cartagena for Intercol which will have about 21,820 b/d cracking facilities.

Two small plants with skimming capacities of 8,000 b/d and 1,000 b/d (shortly to be enlarged to 1,200 b/d) are owned by Colombian Petroleum Co. and The Texas Petroleum Co. at Tibu and Guamo, respectively. Another small refinery is located at La Dorada. It was built by Esso Colombiana and later sold to Intercol; it refines production of the Velasquez field, mostly for tractor fuel and fuel oil for sale to neighboring areas.

Refinery runs during 1955 totaled 14,135,962 bbl or 38,728 b/d; this is 36% of Colombia's oil output. The Barranca Bermeja refinery processed 12,454,102 bbl; the refinery at Petrolea (Barco) had a throughout of 361,863 bbl; and at La Dorada 948,274 bbl were processed. The Texas refinery at Guamo operated at capacity with a total of 391,723 bbl handled. First-half 1956 runs were 41,655 b/d.

In the past Colombian refining has only been able to supply a part of domestic requirements because local refinery output was out of line with demand patterns and transportation difficulties existed. The Barrancabermeja refinery will nearly remedy that situation when its impact is fully felt, but it will still not be able to supply the west coast due to lack of a products line across the Andes. That function will presumably be filled by the Intercol's Cartagena refinery, when complete, via the Panama Canal.

Marketing

Over the years the bulk of Colombia's crude-oil production has been exported. Recently domestic consumption has risen at a rapid rate; and, although it remains on a modest scale, the advance will most likely lower the quantities of crude oil available for export.

With the purpose of lowering these purchases from abroad, the government's refinery at Barranca Bermeja has been expanded. This expansion (together with an improved transportation and distribution system) will enable Colombia to lower imports, but about 25% of requirements are now imported.

Domestic consumption in Colombia during 1955 averaged 42,320 b/d compared with 35,333 b/d in 1954. The estimated increase during 1956 over 1955 is 10%. During the first 6 months of 1956, consumption was running about 46,920 b/d.

During the first half of 1956 crude exports were 12.1 million barrels, down from 12.3 million barrels during the first half of 1955, and 16.4 million barrels in 1954. Most of these exports go to the Dutch West Indies for refining, with the United States the next largest customer—followed by Trinidad, Netherlands, Argentina, Sweden, the United Kingdom, and Uruguay.

Due to distribution difficulties previously mentioned, there are considerable imports of products. These are further increased by the differences between refining throughput in Colombia if compared with consumption.

OIL LAWS

In 1931 Law 37 was passed, and remains the controlling legislation in Colombia today, although strongly modified.

EXPLORATION: Surface reconnaissance may be done freely on public lands. The exploration permit has an initial term of five years in western Colombia, and seven in eastern—with an "ordinary" and an additional "extraordinary" 3-year extension in either western or eastern, contingent on adherence to regulations. This permit is not granted separately, but is part of an exploration-exploitation concession contract.

Maximum exploration area is 50,000 hectares (137,050 acres) in western Colombia, rising to 200,000 (548,200 acres) in eastern—with no limit on the number of these areas or concessions which may be held by any one person or company.

Preference for concessions is given to the first applicant who has accomplished surface reconnaissance work, followed by the owner of the land, the person having exploration activities nearest the area, and finally to the person requesting the largest area. Foreign governments or their companies may not receive concessions. A drilling obligation is contained which stipulates two wells during the ordinary extension in western Colombia and one well during the extraordinary extension in eastern Colombia.

The exploration concessionaires in western Colombia are subject to a surface rental payable annually during exploration ranging from 0.20 pesos per hectare, or about two US cents per acre, in the first year of exploration, to 2.00 pesos per hectare in the 8th year, which is equivalent to about 20.8 US cents per acre. During the 9th and following years the rate is 3.00 pesos per hectare or about 31.34 US cents per acre. These rentals are reduced by one-half while exploratory drilling is in progress and during the exploitation period.

In eastern Colombia the annual surface rental is lower to encourage operations, beginning with 0.10 pesos per hectare or about 1.04 US cents per acre during the first and second years of operations, ranging upward to 0.50 pesos per hectare or about 5.2 US cents per acre during the sixth and following years.

Exemption from import duties is given on materials and equipment used during exploration, as well as from the Colombian patrimony tax until exploration begins.

EXPLOITATION: The exploitation concession in western Colombia has an initial duration of 30 years, renewable (subject to the laws and conditions then in force) for 10 years additional. In eastern Colombia, the initial duration is 50 years, extendible for 20 years more subject to the laws and conditions then in force. The maximum size of the exploitation concession is not fixed, although it would be presumably contained within the limits of the exploration-exploitation concession contract.

Royalty on private lands in eastern Colombia is limited to 3% of production, minus field use. In western Colombia the royalty varies from 7% on production obtained within 62 miles of the coast to 0.5% on production over 559 miles from the coast for production from privately owned lands and mineral rights. This royalty goes 50% to the municipality, state, and district wherein production is found during the first 3 years, after which time their participation is 5%, with the remainder going to the federal government.

Royalty on government lands varies from 13% to 3%, according to distance of the producing site from the coast (as measured by pipeline route). On offshore production the royalty is a flat 10%.

Table III—Royalty Rates in Colombia

Distance From Coast (Kilometers)	Amount (%)	Distance From Coast (Kilometers)	Amount %
0-100	13	600	8
200	12	700	6¾
300	11	800	5½
400	10	900	4½
500	9	Over 900	3

On intermediate distances the royalty is based on arithmetic proportion, down to hundredths.

The guaranty bond continues at one peso per hectare, with a minimum bond of 25,000 hectares. Operators are exempted from all municipal and district taxes. They are also exempted for 30 years from any export tax on production. Additionally, operators may remit abroad without permission of the government the sums of money received from exports, subject only to call on one-fourth such amounts in case of balance-of-payments difficulties in the country. Imports of equipment and materials are exempt from customs duties, including pipe, refineries, pipeline-construction machinery, and equipment for exploratory drilling.

Exploitation concessionaires are given a depletion allowance in western Colombia of 10% of gross income, less royalty payable, limited to a maximum of 35% of net income. Operators already producing oil during August 1955 and investing at least two million pesos in exploration of other than oil-producing properties are given an additional 15% for a total of 25%, up to 35% of net. Operators beginning commercial production after about August 1955 will be subject to a net taxable-income split, the government "take" amounting to a maximum 50% of net income. The exploitation deduction is not limited to the recovery of capital investment as previously. In eastern Colombia this depletion allowance is similar to that in force in the United States, viz., 27½% of gross income up to 50% of net. Exploration and dry-hole expenses may be written off at the rate of 10% yearly.

NATIONAL FACTORS

The attitude of the Colombian government toward private foreign investment has been traditionally favorable. With the passage of recent incentives to exploration, the country becomes an interesting site for possible investment. Contemplated investment should not ignore the large amount of expenditure already incurred in Colombia without obtaining production, however. International Petroleum Co. (Intercol) during the five years of 1951-1955 spent $45 million without making any large discoveries. Tropical Oil Co. carried out exploration work outside De Mares totaling $32 million, also without large discoveries. Intercol budgeted $12.1 million for 1956 and $13.4 million for 1957, in addition to the expenditures already incurred. Standard Oil Co. of California, through Richmond Petroleum Co., spent over $27 million prior to 1950 and more since, but has not yet found any commercial production. END

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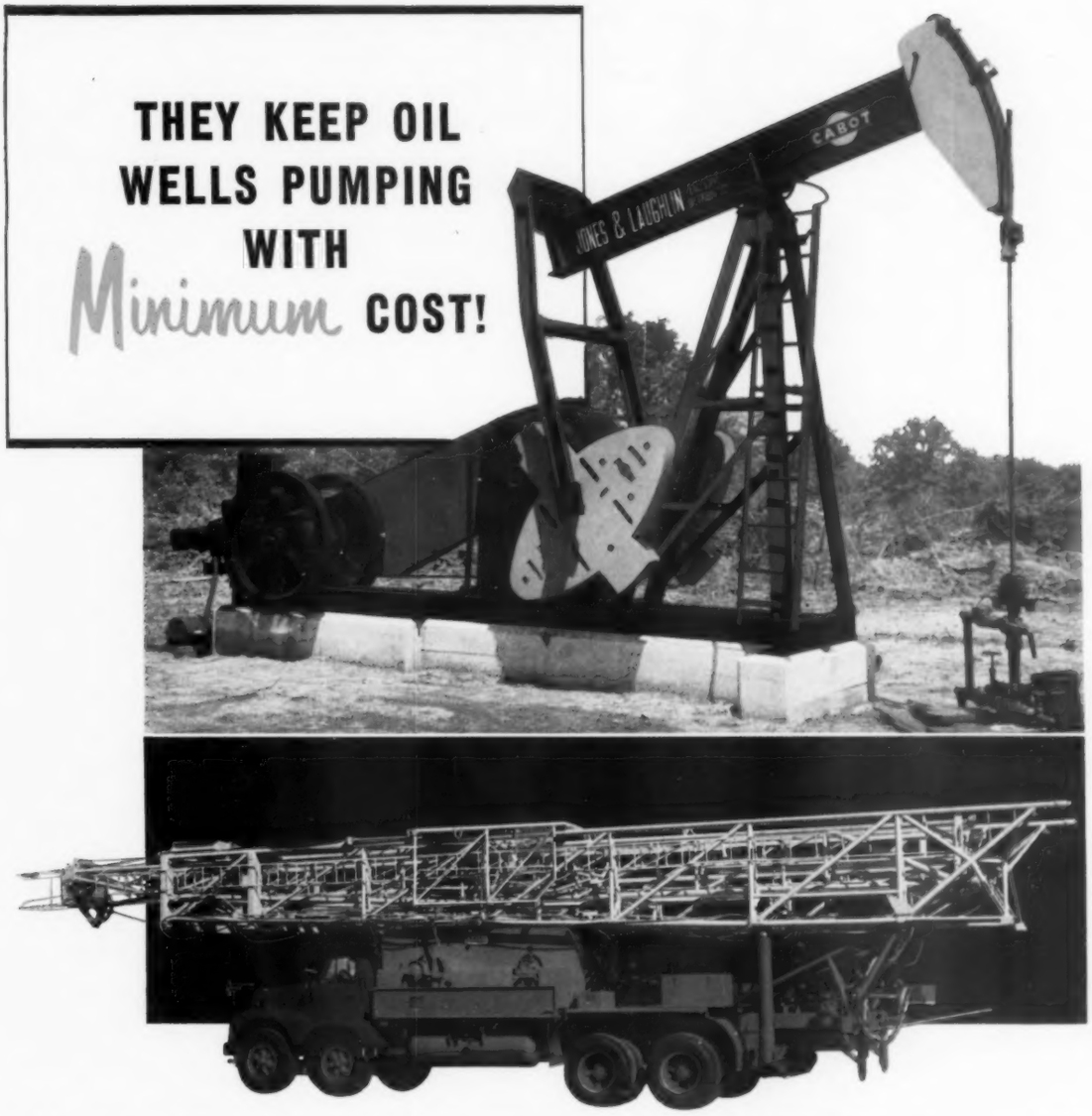

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COSTA RICA

Exploration

Petroleum seepages have been reported for many years, and as early as 1886 a petroleum claim was filed by a Dr. Fernandez in the province of Limon. This concession, with additional territory, was later transferred to the Costa Rica Oil Co., a subsidiary of Sinclair Oil, and lapsed in 1926. A succession of other holdings followed, all of which subsequently were abandoned. The Honolulu Oil Corp. proposed a contract which was submitted to the Costa Rica Congress in 1949, and failed of ratification at that time. On November 9, 1951 a contract between Compania Petrolera de Costa Rica Ltda., a subsidiary of Union Oil Co. of California, and the government of Costa Rica was concluded. This concession covers the provinces of Limon and Guanacaste, as indicated on the accompanying map.

Five wells were drilled rapidly. The first was Patiño No. 1, abandoned during January 1955 at 6,754 ft. Cost of the well was estimated at $450,000; it is not considered one of the 3 wells the company is obligated to drill under the concession contract. Patiño No. 2 was drilled, as indicated on the accompanying map; it also came in dry. A third dry well, Bris No. 1, was spudded in, July 23, 1955, and abandoned at 7,969 ft. It was primarily a stratigraphic test.

During late 1955 a fourth well, Cocoles No. 1, was spudded. Oil shows were encountered at 3,540 ft. The well was deepened, and further shows of good gravity oil were encountered in limestone at 5,450 ft. Pay section was said to be 114 ft. The section was sealed off, and the well was carried down to about 10,000 ft. It is located about ½ mile from the border of Panama and 21 miles inland from the Caribbean. When commercial production is obtained, the concession reportedly calls for all but 150,000 hectares of the concession to be turned back to the government. An offset well, Cocoles No. 2, was spudded, and on September 5 Union Oil announced a commercial discovery at about 4,945 ft in porous limestone. The well tested 2,000 b/d on a 30/64-in. choke on a 7-hour production test. Oil was of 46 API gravity. Tubing pressure on original tests was 500 psi. Later, in October, under high pressure the well began to flow 72% salt water. However, the water was not coming from the oil zone, and the well was allowed to flow in an attempt to exhaust the salt water. The attempt was not successful, and the company has stated production from Cocoles No. 2 would not be commercially feasible. Cocoles No. 3 is now drilling higher on the structure.

Late in 1956 the government announced that bids for exploration are to be sought from oil companies in the province of Heridia, northwest of San Jose and Pontarenas provinces, bordering the Pacific. Union Oil presently holds rights to this area, but must give up substantial acreage on production from its new discovery.

Refining, Transportation, Marketing

There is no refining in Costa Rica, although a proposal by a group of American investors to build a 4,000 b/d refinery was recently submitted to the legislative assembly. All consumption in the country, about 2,200 b/d, is imported in the form of products. It is supplied by Esso, Union Oil, and Texaco companies, through Puerto Limon on the east coast and Caldera, Punta Arenas, Quipos, and Golfito on the west.

Total imports during 1953, last year of available figures, were as follows (in tons): kerosine, 7,717.4; diesel and other fuel oils, 80,605.1; asphalt, 5,023.1; gasolines, 52,638.6; greases and lubricants, 3,532.0.

OIL LAWS

There is no special petroleum law in Costa Rica at present. The applying legal regulations are those of the constitution of 1949 which provides, in Art. 121, that the petroleum subsoil is permanently the property of the nation, and that petroleum may be exploited only according to the provisions of law or by special contract granted on such conditions as may be established by the assembly. A new mining code was passed in 1953 which provided that petroleum was subject to special concession contracts. A new law is now in the process of formation. It is based on the 50-50 profits split, and is to be published shortly. Three areas in Haredia and Puntarenas provinces are excluded from the law and put up for bids, subject to the same profits division as contemplated in the new draft law.

Since there is no petroleum law applicable, the Union Oil contract of April 25, 1951 is the best indication of the demands of the assembly. It provides for an exploration period of 6 years, to be followed by a 40-year exploitation period if commercial oil is found. The concession area covers about three million acres of lands in the Limon and Guanacaste provinces. The concessionaire had to pay a cash bonus of $18,000 and to obligate himself to spend at least $200,000 during the first 2 years and an equal amount during the following 2 years. Work obligations include drilling of at least three wells before the operations may be abandoned. A rental of 17.83 US cents per hectare must be paid. If production is below 5,000 b/d, a royalty of 10% is to be paid, in cash or in kind. After production reaches 15,000 b/d, the royalty payment will be increased to 16 2/3%. The concessionaire is exempt from export duty on petroleum and petroleum products, as well as from import duty on goods, as long as production is below 5,000 b/d. The contract explicitly authorizes the company to build a refinery—on condition, however, that commercial oil has been found.

NATIONAL FACTORS

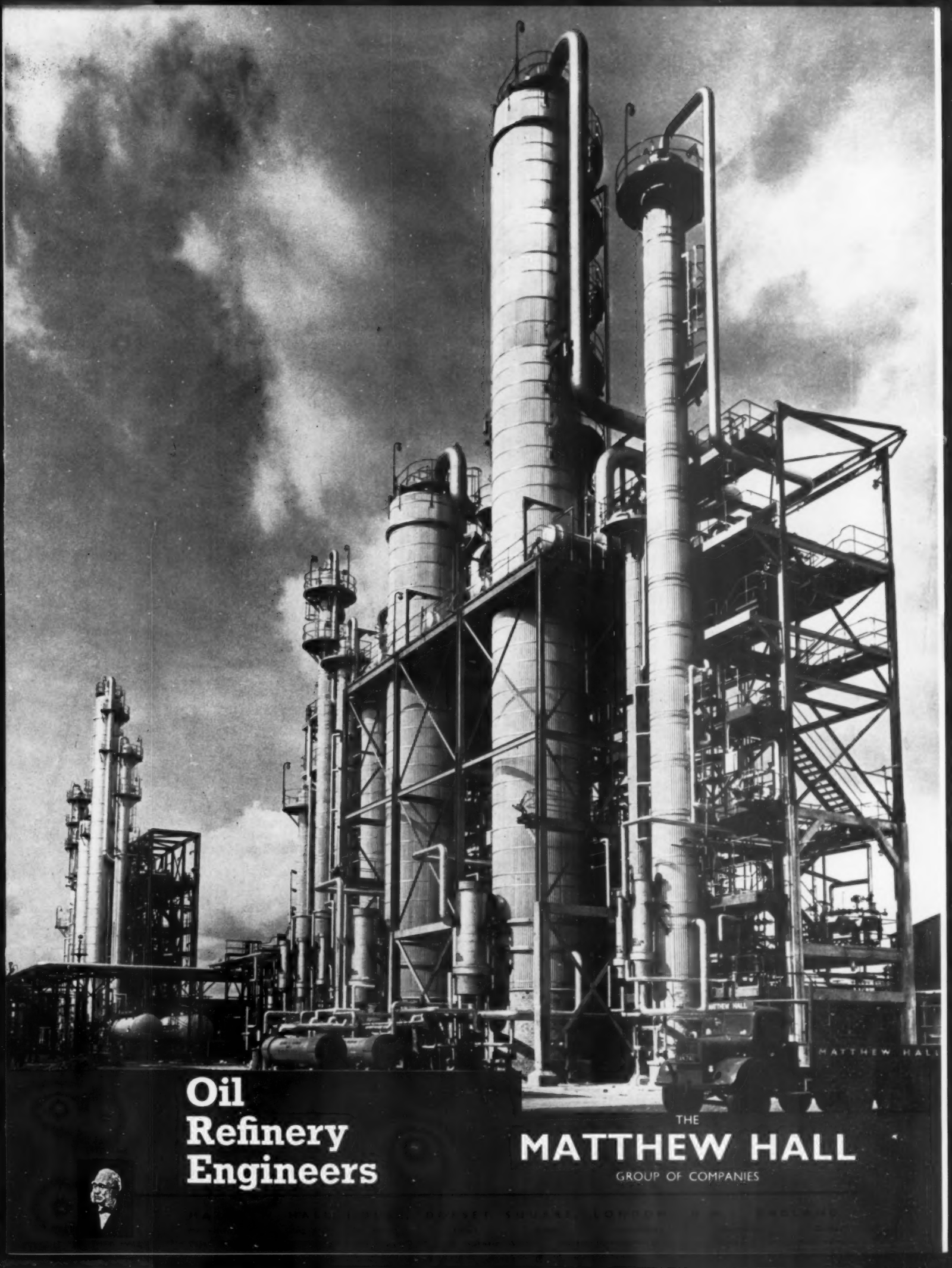
Since the establishment as a separate State in 1848, Costa Rica has enjoyed a relatively stable government under able leaders, except for brief periods such as 1948 when a contested election between Dr. Ulate and President Calderon Guardia resulted in a revolt headed by Colonel Jose Figueres, who established a military junta. The revolution stopped communist control of labor, and it later culminated in the election of President Figueres.

The attitude of the government toward foreign private capital is favorable, and there is little anti-American sentiment within the country. President Figueres expressed his attitude toward foreign investment when he stated that he favors developmental capital which gradually will be withdrawn over the years, rather than permanent capital. Although Law No. 52 of December 28, 1943 restricts new commercial enterprises in sales and distribution (not production) to Costa Ricans unless a treaty of amity and commerce has been established, such a treaty has been in effect with the United States since 1852.

One indication of the attitude of the government is given in its negotiations with United Fruit Co., long one of the trouble points but mainstays of the economy. A new contract, concluded in 1954 for a 34-year term, was signed in a friendly atmosphere; it provides for minimum wages and a higher tax rate, amounting to a total contribution by the company of about 42% of net income.

The Costa Rica income tax was revised in 1954 to range from 1% on income below 3,000 colones to 30% on income in excess of 500,000 colones (US $89,050). The deductions given are substantially the same as for the old law, tax being assessed on net income, which permits deductions for wages and salaries, other taxes, insurance costs or losses not covered by insurance, and amortization for depreciation on plant and equipment. By Law No. 36 of December 21, 1940, tax and customs exemptions are given to new industries.

The unit of currency is the colone. By law of September 29, 1951, there are two rates, the official and the free. The par value of the official rate is 5.615 colones per US dollar, with 5.60 per dollar for exports, 5.67 per dollar for imports. The free-market selling rate covers all nonessential imports and invisibles, and is 6.65; however, the use of a mixed rate brings in capital at either the official or free rate. If the official rate is utilized, the Central Bank, which controls the exchange market, undertakes to provide official exchange for remittance of profits and dividends, and amortization of the capital. If the free market is used, no registration is necessary, and remittances must be at the free rate. Under the old law, and probably under the new, all remittances to foreign enterprises operating under government concession or contract must go through the official exchange market, and all proceeds from export of national products are classified as official exchange. END



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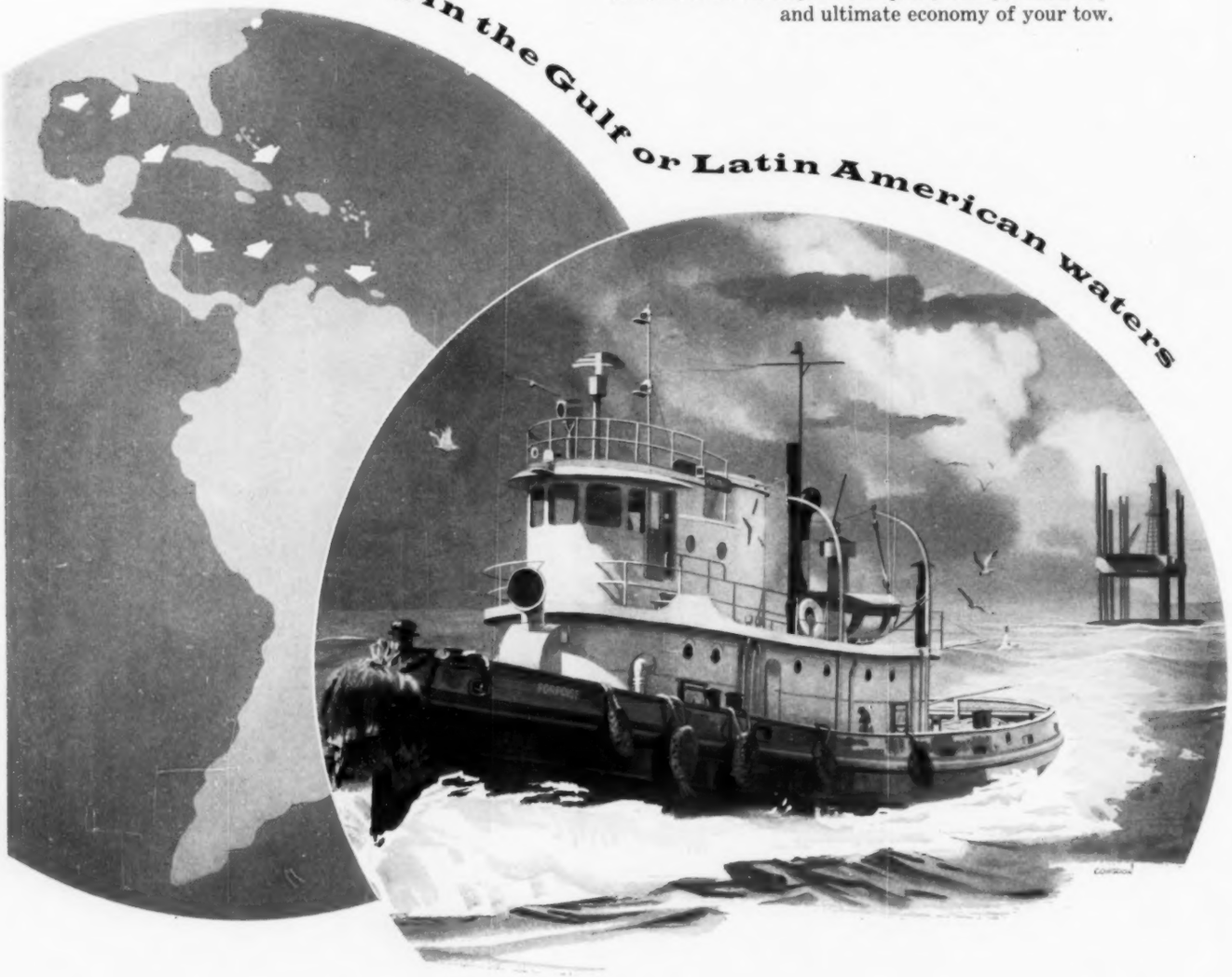

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CUBA

Exploration

The Cuban petroleum industry is undergoing an exploration boom occasioned by the Echevarria I discovery well at Jatibonico in the province of Camaguay, in May 1954, near the middle of the island. The well was drilled by Corporacion General de Petroleo, associated with Refinadora Cabaiguan SA, a local Cuban company, and Kerr-McGee Oil Industries Inc., an American concern. It is now producing about 50 b/d of heavy 15 API gravity crude. The well is important because it was the first sedimentary production in Cuba, completed at 1,072 ft in the Cretaceous, whereas all the previous fields had been small producers from the serpentine rocks of igneous origin. More than 20 additional producing wells have been drilled in the field, with production in excess of 800 b/d at present. Since the discovery well, exploration concessions have been taken out almost everywhere on the island. The largest entity is Cuban Venezuelan Oil Voting Trust which was formed in 1950 by 24 companies for exploration in Cuba. Holdings of the 24 companies total about 16 million acres. The group at present has about 2 million left, having farmed out the remainder to other companies for drilling. Largest of these farmouts was to Stanolind Oil and Gas Co., a subsidiary of Standard Oil Co. (Indiana), which has contracted to spend $14,750,000 over 7 years in exchange for 50% rights to about 13½ million acres.

Another major event in exploration was the re-entry of Esso Standard into Cuban exploration after having drilled several dry holes in the past. Esso acquired a 75% interest in exploration concession applications on 926,525 acres through Cuban Canadian, a subsidiary of American Leduc. Cuban Canadian retains 25% with a 5% gross royalty. The acreage is in central Cuba, in the provinces of Havana, Pinar del Rio, and Matanzas. Cuban Canadian has filed applications on about 12 million additional acres.

Greatest interest in 1956 centered on Cuban American's 7,137-ft test which bottomed in Upper Cretaceous limestone. This well, Catalina No. 1, is 2 miles south of the town of Jatibonica. A drill-stem test indicated the well would be a 800 to 1,000 b/d producer of 32.9 API gravity oil—and excitement ran high. However, unexplainedly, upon completion the well was producing 25 b/d to 50 b/d. Majority opinion is that it is a question of porosity and, instead of attempting to "frac" the well, another test now is drilling on the structure.

A serpentine discovery in May 1956, just east of the city of Havana in the Bacuranao oil field area, produced 590 b/d of 28-gravity oil from 1,180 ft for several months. It is owned by Consolidated Cuban Oil Co., a new independent company with approximately half a million acres of concessions scattered throughout the island. It was hoped that the unusually high production of this new serpentine discovery was due to a fracture system of higher porosity and permeability which had a direct connection with a large reservoir of oil below.

Production

Production was 1,491 b/d in 1956. It is mostly from Jatibonico now, but formerly was derived mostly from the Jarahueca field, discovered in 1943; the old Motembo field, discovered in Las Villas province around 1880; and a third old field, Bacuranao. This field saw 2 discoveries in 1955—one by Ted Jones Drilling Co. on a limestone flank of Bacuranao of about 40 b/d initial production. The other, the Salomon-Masvidal (now Cruz Verde No. 1) well, is about a mile from Bacuranao, which came in at a high rate, but fell off sharply.

Total Cuban reserves, as of January 1, 1956, are estimated at 3,000,000 bbl.

Refining

Total Cuban refining capacity is now only 10,700 b/d, but will be raised to 85,500 b/d when new plants are completed. Construction of new refineries has been considerably stimulated by special legislation.

OIL LAWS

Petroleum activities in Cuba are governed by the Law of Combustible Minerals of May 9, 1938, and its regulations as contained in Decree 2625 of October 15, 1939.

Following the discovery at Jatibonico, Decree Law 1526 of July 8, 1954 was passed to encourage petroleum development by special incentives for 5 years following the law, or until July 8, 1959. The Cuban government has offered to put up $666,666 for each million dollars invested by exploring companies in drilling. If oil is discovered, a 10% bonus on this loan will be due the government after the principal and interests are fully paid, plus a 10% royalty (the regular rate), and an additional royalty running from 2.5% on 1,000 b/d production to 0.25% on 50,000 b/d. (If no oil is found, the loan need not be repaid.) In addition, under Law of 1954, the government will extend the 30-year development term for 10 years at 20% royalty for discoverers within the next 5 years.

Other incentives offered include: a 10-year exemption from the 10% profits tax provided by the Profits Tax Law of July 29, 1932, and from the tax on capital to companies with one million dollars to spend on exploration and immediate drilling—which tax was instituted by Law of April 5, 1942; reduction for the next 5 years of surface tax from 15 cents per hectare ($0.06 per acre) to 5 cents per hectare ($0.02 per acre); and shortening of the period normally required for conversion of the exploration concession to a development concession.

EXPLORATION: Under the general regimen of Law of 1938, exploration concessions have a 3-year nonextendible term. Concessionaires have a preferential right on new concessions covering the same area.

The maximum area per exploration concession is about 80,000 acres, with a maximum total of about 741,312 acres in exploration concessions to any one person or company.

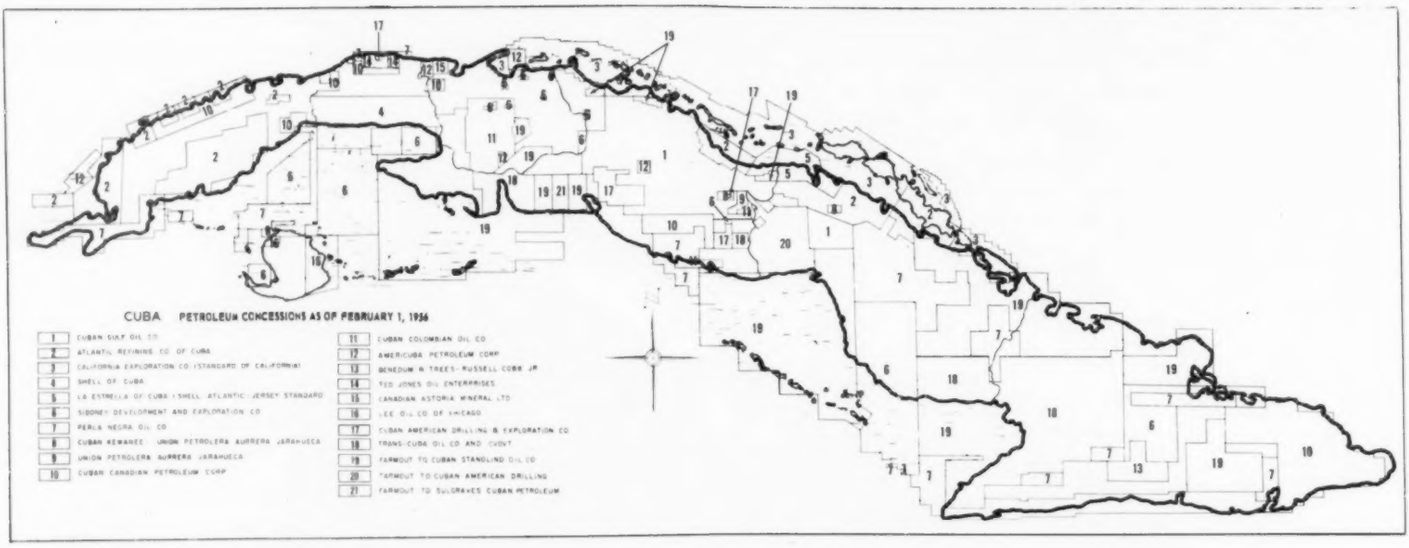
The concession may be surrendered fully or in part at any time, or converted to a development concession. There is no drilling obligation (unless fiscal exemptions under the 1954 law were claimed).

Fiscal obligations include an annual rent of 15 US cents per hectare (about 6 US cents per acre), payable 15 days after approval of the concession (under the 1954 law reduced to 5 US cents per hectare).

EXPLOITATION: Conversion appears to be guaranteed to the holder of the original exploration concession (by Art. 7 and 20 of the law of 1938). The area desired for a development concession must be divided, in the application, into eight lots. The concessionaire is first entitled to select one of these lots; the government is entitled to choose one for inclusion in the national reserves, and the remainder is then given to the concessionaire. The area which may be left over from the exploration concession also goes into national reserves.

The duration of the development concession is 30 years, with a possible extension for 10 years, on certain conditions, under the 1954 law. Through public bidding, the expired concession may be re-acquired.

The maximum size per concession is about 20,000 acres; the minimum is 40 acres. The total area of the exploration and development concessions held by a single company or entity may not exceed 741,312 acres.


CUBA PETROLEUM CONCESSIONS AS OF FEBRUARY 1, 1956
1 CUBAN GULF OIL CO
2 ATLANTIC REFINING CO OF CUBA
3 CALIFORNIA EXPLORATION CO (STANDARD OF CALIFORNIA)
4 SHELL OF CUBA
5 LA ESTRELLA OF CUBA (SHELL, ATLANTIC, JERSEY STANDARD)
6 SIDNEY DEVELOPMENT AND EXPLORATION CO
7 PERLA NEGRA OIL CO
8 CUBAN KEMBARGE - UNION PETROLERA AURRERA JARAHUECA
9 UNION PETROLERA AURRERA JARAHUECA
10 CUBAN CANADIAN PETROLEUM CORP
11 CUBAN COLOMBIAN OIL CO
12 AMERICUBA PETROLEUM CORP
13 BENEDUM & TREES - RUSSELL COBB JR
14 TED JONES OIL ENTERPRISES
15 CANADIAN ASTORIA MINERAL LTD
16 LEE OIL CO OF CHICAGO
17 CUBAN AMERICAN DRILLING & EXPLORATION CO
18 TRANS-CUBA OIL CO AND CUBVT
19 FARMOUT TO CUBAN STANOLIND OIL CO
20 FARMOUT TO CUBAN AMERICAN DRILLING
21 FARMOUT TO SULGRAVES CUBAN PETROLEUM

Drilling obligations are conditioned on the concession size. For concessions of 4 to 200 pertenencias (a pertenencia is 4 hectares), one well must be drilled every 10 years; for those of 200 to 1,000 pertenencias, one well must be drilled every 8 years; for those of 1,000 to 3,000 pertenencias, one well must be drilled every 7 years; for those of 3,000 to 6,000 pertenencias, one well must be drilled every 6 years. If over 6,000 pertenencias (or about 58,800 acres in size), one well must be drilled every 5 years. The minimum depth of any well is 4,000 ft. Concessions in the same zone and totaling less than the 20,000-acre limit may be grouped to meet drilling obligations with one well.

Fiscal obligations of the concession include: a deposit of minimum 120 US dollars, plus 1 cent for each hectare; a title fee of $1.00 per hectare; an annual surface tax; and a royalty. The surface tax, except for the 5-cent 5-year privilege granted by Decree 1526, is 10 centavos per hectare (which amounts to about 4 US cents per acre) during the first 10 concession years, rising to 20 centavos per hectare in the second 10-year period, and to 40 US cents per hectare during the third 10-year period. The royalty payable is 11% of the value of the oil produced, of which 10% goes to the government and 1% to the surface owner. If the producer refines in Cuba, the government share of royalty is reduced to 9%. There is, however, no obligation to refine.

National reserves are set aside by the government from concessions surrendered or rejected, and from the share accruing from conversion of exploration concessions to development concessions, as covered earlier. These areas are to be developed by Cuban companies, but there are no restrictions on ownership of these companies. The petroleum law applies to the concessions under national reserve, but they are issued competitively on a big basis—with the minimum terms being those stipulated in the law. During 1954 a large amount of the national reserves was opened to concession; so their total area is now small.

TRANSPORTATION AND REFINING: There are also concessions given for pipelines and refining. Pipeline concessions are divided into three classes: first and second class of common-carrier and private pipeline concession. The term for common carriers is 30 years, at the end of which the line becomes the property of the government unless re-acquired through public bidding. Second-class common carriers and private lines are concessions given only to holders of development concessions, the former being obligated to transport oil of third parties if capacity is available, the latter obligated to transport government oil, at cost, up to 11% of pipeline capacity. Both classes pay no special tax unless they transport oil for third parties, when they must pay 2½% gross income from such service. First-class pipeline concessions may be granted to anybody complying with the general requirements for concessions.

Refining concessions are granted after review of plans by the Secretariat of Agriculture. Refineries may process any oil desired, but are obligated to process oil for the government at cost, plus maximum 10%. Special benefits are given by Law-Decree No. 1758 of November 2, 1954.

NATIONAL FACTORS

The national attitude toward foreign investment is favorable, as concerns the government. There are no restrictions placed on foreign ownership of domestic corporations nor registration of foreign corporations. There is no restriction as to nationality or residence of directors or shareholders, nor any prohibition against holding directors' meetings outside Cuba.

Corporate income taxation in Cuba ranges from 18% on profits up to 100,000 cuban pesos to 36% on amounts in excess of 1 million pesos. Foreign companies with branches in Cuba may pay a 3.6% tax on gross receipts in lieu of the regular corporation taxes. In addition, all companies pay a 25% excess-profits tax on profits in excess of 10% of working capital declared in Cuba. There is also a 4% tax on undistributed profits if they exceed 30% of the paid-in capital. On undistributed profits exceeding 30%, but less than 60% of paid-in capital, corporations must distribute 50% of their profits in dividends; if between 60% and 100%, 75% must be distributed; and, if undistributed profits exceed paid-in capital, the total profits for the year must be distributed.

Exemption in part may be given new industries, and depreciation allowances at 10% annually for heavy capital goods are customary.

The official Cuban unit of currency is the peso; and, although it is maintained on a par with the US dollar, as of June 30, 1951 the dollar was no longer legal tender in Cuba. The law governing exchange is Law-Decree No. 569, effective January 2, 1953. There are no exchange regulations against the US dollar and no restrictions on the right to import and/or export capital, except in the case of sugar, where 30% of receipts must be turned over for pesos. A 2% tax is payable on the exportation of exchange—which would mean, in effect, a change in the exchange rate. However, exemption from this 2% money export tax is available under Law-Decree No. 548 governing funds brought in through banks for investment in approved industrial enterprises. This also applies to machinery and equipment which, in addition, may be brought in free of duty if destined for approved new industries.

Large foreign ownership in the sugar industry is often a source of unrest in labor unions. Organized labor is backed by a restrictive labor code which makes it difficult for employers to dismiss employees who have been hired for over six months, and disputes are usually settled in favor of the unions.

The existing wage structure in Cuba is about $2.54 for unskilled labor, and $3.60 per day for skilled labor. The wages of petroleum workers are estimated at $3.74 per day for common labor; $5.80 per day for skilled workers.

TABLE I—CUBAN REFINERIES

Company	Location	Crude Capacity
Compania Petrolera Shell	Havana (1)	28,500
Esso Standard Oil Co.	Belot (Havana) (2)	8,700 S
Refinadora Cabaiguan	Cabaiguan	2,000 S
The Texas Co.	Santiago (3)	20,000

(1) Completed December 1956.
(2) Expansion program under way. Crude capacity is being increased to 35,000 b/d.
(3) Under construction; complete early 1957.
S—Skimming.

TABLE II—CUBAN CRUDE PRODUCTION—1956
(Thousands of Barrels Per Day)

January	1.5	July	1.5
February	1.6	August	1.7
March	1.5	September	1.7
April	1.6	October	1.6
May	1.5	November	1.2
June	1.3	December	1.2
		Year	1.5

ECUADOR

Exploration

Petroleum companies interested in exploration in Ecuador include California Ecuador Petroleum Co., a subsidiary of Standard Oil of California, and the Pantepec Oil Co., which in 1955 bought a 50.5% interest in the Manabi Exploration Co. All exploration operations are conducted by private companies; no government-owned companies are exploring. Despite intensive exploration, no major discoveries have resulted to date. A total of 208 wells was drilled in Ecuador during 1955—20 of them exploratory—with no gas discoveries during the year; but 13 of the exploratory wells discovered oil. Manabi Exploration Co. reached a new producing formation recently in the old Tigre field at 1,000 ft to 1,500 ft, and made a 95 b/d discovery on the San Raimundo concession. However, none of these tests appears to indicate a major discovery. During the first half of 1956 wells drilled totaled 93, with total footage around 170,000. Of the total wells, 85 were completed as development wells. None was an exploratory discovery—the principal company actively exploring at present being Standard Oil Co. of California, through its Ecuadorian subsidiary.

Well drilling in 1955, by company, was as follows:

	Exploitation	Exploration
Anglo-Ecuadorian	140	19
Manabi	36	—
Carolina	9	1
Concepcion	3	—
	188	20

During 1956 Anglo-Ecuadorian planned drilling as follows: deep exploration wells, 1; deep exploitation wells, 1; exploration wells, 4; shallow exploitation wells, 94.

Carolina planned 6 exploitation wells in 1956.

Production

Petroleum production began in 1917, and increased until 1942, since when it has remained almost stationary. Daily average production in 1955 was 9,841 bbl. Cumulative crude output through 1955 was 65,048,381 bbl.

All this production has come from the Santa Elena peninsula. A large share of past production has been by Anglo-Ecuadorian Oilfields Ltd., owned by Lobitos Oilfields, Ltd. with South American Gold and Platinum Co. of New York holding a 10% interest. The company has other operating companies: Carolina Oil Co., Petropolis Oil Co., and Concepcion Ecuadorian Oilfields Ltd., operating in the El Cautivo and El Tigre areas, which formerly belonged to Ecuador Oilfields Ltd., a wholly-owned subsidiary of British Controlled Oilfields.

TABLE I—ECUADORIAN CRUDE PRODUCTION—1956
(Thousands of Barrels Per Day)

January	10.3	July	9.9
February	9.5	August	9.8*
March	10.1	September	9.0
April	9.5	October	9.2
May	9.7	November	9.0
June	9.8	December	8.8
		Year	9.6*

*Estimate.

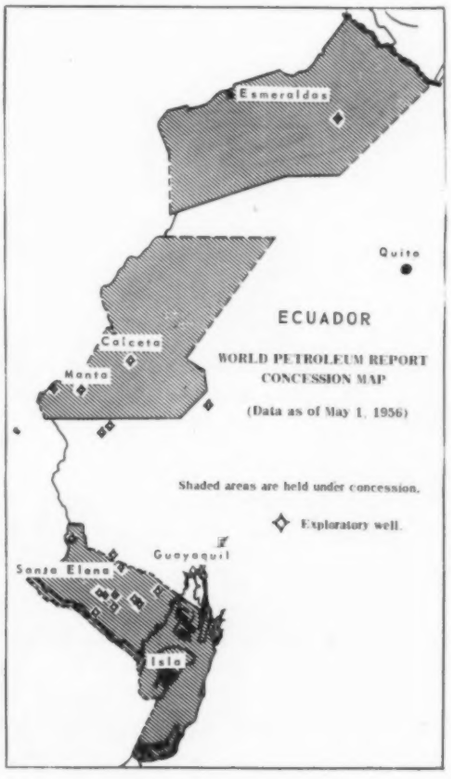
Refining

The three refineries operating in Ecuador in 1955 had a total throughput of 5,500 b/d. Anglo Ecuadorian has a skimming plant at La Libertad which produces 7,000 b/d. An atmospheric distillation unit of about 550 b/d capacity is being added. Manabi Exploration has a new topping plant of 660 b/d capacity at Cautivo on the Santa Elena peninsula. Total runs in May 1956 were 5,917 b/d.

A contract was signed by Anglo-Ecuadorian Oilfields Ltd. with the government, during 1956, under which the company will build a new 6,000 b/d refinery. This will enable Ecuadorian refineries to supply all of national demand, except for aviation gasoline.

TABLE II—ECUADORIAN REFINERY OUTPUT—1955
(Gallons)

Gasoline	27,691,578
Kerosine	8,258,981
Diesel oil	14,295,332
Residual fuel oil	32,526,359
Jet fuel	572,645
Lube oils—light	190,754
Lube oils—heavy	79,765
Asphalt	106,830
	83,722,244
Grease	19,391



Marketing

Ecuador has long been a petroleum exporter. In 1955 exports were 4,217 b/d. Principal markets are Uruguay, Argentina, and the Netherlands West Indies. Also slight amounts of petroleum products are imported, since the traditional position of Ecuador is that of a crude exporter and importer of some specialized products. Imports were 2,015 b/d in 1955. They originated principally in the Netherlands West Indies and the United States. Consumption in 1955 was 7,440 b/d. Expressed in terms of crude equivalent, this was expected to average 9,000 b/d in 1956 and 12,000 b/d in 1960.

OIL LAWS

Petroleum Law No. 70 of August 6, 1937, amended April 8, 1938, provides that petroleum and hydrocarbons are the property of the State and that the petroleum industry is a public utility.

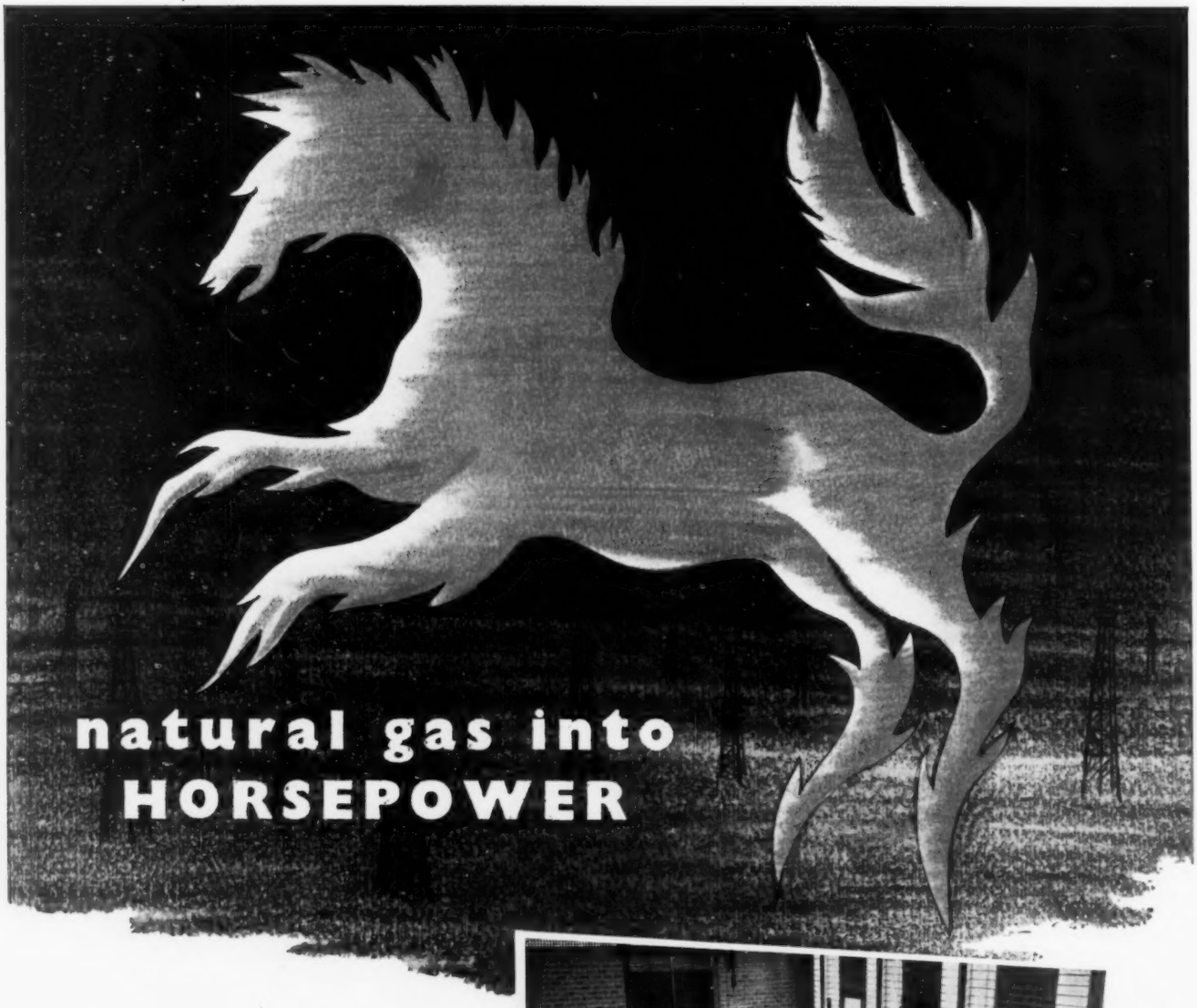
EXPLORATION: There is no restriction on conducting surveys and general geological work before receiving an exploration concession. "Study" concessions may be issued by the government, for a period of four years. The fees to be paid are to be fixed by the government in each case.

The complete exploration concession is of two types: the concession acquired by claim and by contract. Duration of the concession by contract is five years; for concession by claim, it is two years. In the eastern region of Ecuador these are extendible by three years and one year, respectively.

The concessions may be surrendered at will, and surrender in part is also permitted, unless a minimum number of acres is stipulated in the original contract.

Maximum area of the concession by contract is 50,000 hectares (about 125,000 acres); for concession by claim, it is 80 hectares maximum (200 acres). In the eastern region the government may conclude special contracts. It may increase the area on any concession after special consideration.

Fiscal obligations of the exploration concession include a returnable guaranty bond of



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10,000 sucres (about US $660), plus one sucre per hectare (US $0.025 per acre) of the concession. Special bonds may be required for the eastern region, which may be forfeited if work is not begun within the first two years.

Concessionaires are subject to all general taxes, plus a special surface tax which amounts to 20 centavos per hectare in the first two years, 40 centavos per hectare in the third, 80 centavos per hectare in the fourth, and one sucre per hectare (about US $0.26 per acre) thereafter. Special taxes may be established for the eastern (Oriente) region.

EXPLOITATION: Exploitation concessions are also divided into those acquired by claim and by contract. Concessions by contract have an initial term of 40 years and right to extension of 10 years. Concessions by claim have an original term of 20 years and an extension of 5 years. Maximum and minimum areas are 50,000 and 80 hectares, respectively. The right to surrender is also contained.

Surface taxes are the same as for the exploration concession. Royalty is on a sliding scale, depending on the distance of the production site from the nearest port, amounting to 11% of net production for distances of 0 km to 50 km, 10% for 50 km to 100 km, 9% for 100 km to 150 km, 8% for 150 km to 200 km, 7% for 200 km to 300 km, 6% for 300 km to 600 km, and 5% for distances in excess of 600 km.

Royalty is payable in cash or in kind. In lieu of royalty, concessionaire may undertake certain construction work or other projects.

The minimum annual investment is not stipulated by law, but is to be fixed in the concession. The government automatically establishes national reserves over all those areas previously covered by concessions which have been surrendered or revoked. These may be reissued to applicants considered most competent by the government. Terms of same are to be the same as those stipulated in the petroleum law.

TRANSPORTATION, REFINING: Holders of exploitation concessions are given the right to a 30-year pipeline concession, plus a 10-year extension, at the end of which the pipeline becomes the property of the State. A transportation tax is levied in the amount of 5% of the value of oil transported, and the government has a prior right over 20% of the pipeline capacity for transport of its own oil. The tariffs for the pipeline are to be determined by agreement, taking into account expenses, amortization of capital, and fair profit.

Refining concessions are an automatic privilege of development concessionaires for the duration of their concession. Such refineries may be established only at the refiner's own production source or port of shipment. Persons not holding development concessions may receive a special refining contract for a 30-year term, with a guaranty bond of 15,000 sucres deposited.

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NATIONAL FACTORS

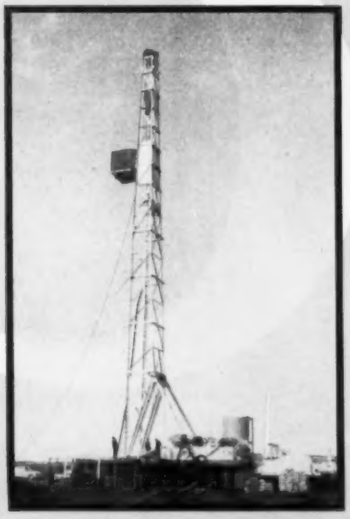
There are several aspects of Ecuador's national background which have a bearing on petroleum or other foreign investment. Political stability, which was distinctly lacking in the period between the world wars, has been achieved since the end of World War II and continued since.

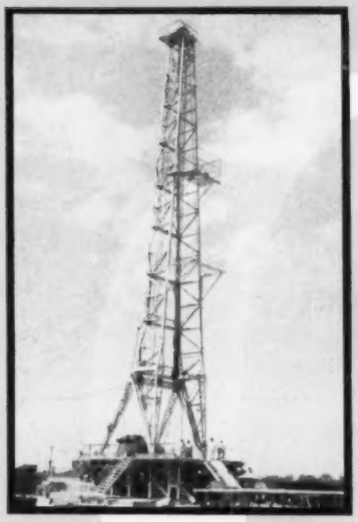
The national attitude toward foreign investment is friendly, as shown in the history of the petroleum industry which has remained mostly free of government control or undue restriction.

Exchange control is effected through the Central Bank of Ecuador which maintains an official and free rate. The official unit of currency, the sucre, has a current official par value of 15 sucres per US dollar (or 0.066 cent per sucre) buying, 15.15 selling. Under the Emergency Law on International Exchange of June 5, 1947, the official rate applies to most exports and essential imports, and the selling rate applies to transfer of dividends, interest, and amortization payments by foreign capital. The free rate is controlled at around 17.36 sucres per dollar, buying and selling.

Generally, foreign capital may enter if for approved purposes and registered at the central bank. Capital and profits may be transferred at the official rate with prior governmental authorization. If capital is not registered, it may be brought in freely and amortization and profits remitted in unlimited amounts through the free market.

Income-tax rates begin at 10% on incomes of 5,000 sucres or less, and rise to 22% on incomes in excess of 200,000 sucres. In addition, there is a 5% tax on all income in excess of 12,000 sucres. Deductions include interest and costs on borrowed capital and amortization customarily made on replacement of equipment. A further tax is payable by corporations of 16% on undistributed profits in excess of 50,000 sucres and up to 22% on dividends in excess of 200,000 sucres per year to foreign stockholders. Foreign companies pay a surcharge of 1% on profits, less dividends paid to resident stockholders. There is an additional capital tax of one per mill on registered capital. END





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EGYPT

Exploration

Until recently the principal explorer was Anglo-Egyption Oilfields Ltd. (AEO), formerly owned 50-50 by the British Petroleum Co. and the Shell group. In April 1946 AEO located the Sudr oil field on the Sinai peninsula. This discovery was followed a few months later by the ASL discovery, southeast of Sudr. In November 1948 AEO discovered Ras Matarma oil field, located between the previous two discoveries.

Early in 1949 Standard Oil Co. of Egypt, a subsidiary of Standard Oil Co. (New Jersey), reported a discovery at Wadi-el-Feiran, after about 12 years of exploratory work in Egypt. The company developed a producing well, but shortly thereafter abandoned all its operations following the Restrictive Mines and Quarries Law of 1948.

Thereafter National Petroleum Co. of Egypt SAE was activated as an operating company for the International Egyptian Oil Co. created, March 15, 1952, with the capital contributed by the Southern California Petroleum Co., the Blair interests, and a group of Swiss bankers associated with the Hoffman Bank of Zürich. Later the Italian government agency, Azienda Generale Italiana Petroli (AGIP) and the Belgian Compagnie Financière Bèlge des Pétroles SA (Petrofina) acquired shares in this company. and the American Southern California Petroleum Co. became their operator. The first discovery since 1948 of a major oil field occurred at Belayim, where a producing well was completed by the Southern California Petroleum Co., operating on behalf of the International Egyptian Oil Co. (IEOC), in February 1953. IEOC also continued exploration of the Ras Gharib field, discovered in 1938 by the Standard Oil Co. of Egypt, from which they acquired it. IEOC was also successful in an area adjoining Belayim at Feiran, where oil was discovered later, in 1955.

Another group of oil companies became interested, after the enactment of the 1953 law, in the search for oil in the areas west of the Gulf of Suez, including Continental Oil Co., The Ohio Oil Co., Cities Service Co., and Richfield Oil Corp. The first two companies acquired a concession, covering about 72,000 square miles in the Egyptian western desert, through their joint subsidiary, Conorada Petroleum Corp. headed by C. F. Dohm. The latter 2 companies obtained an area of about 14,000 square miles immediately east of the Conorada concession. The four holder-companies of western-desert prospecting areas later reached an agreement under which they pooled their areas through Sahara Petroleum Co.

A deep exploratory test was drilled by Sahara Petroleum Co., in 1955. The well, Borg-el-Arab, was located 28 miles southwest of Alexandria, and went below 10,200 ft, with no commercial shows. Another was begun about 60 miles southeast of Alexandria, early in 1956, which went below 13,000 ft. No oil or gas shows on the well, known as Wadi Natrun, were reported, and it has been abandoned. A third rig was shipped in early 1956. It spudded in at Bibb Affia, west of the Qattara depression and near the oasis of Siwa. A third wildcat at Marsa Matrouh, west of the Borg-el-Arab well, was begun—again with no oil or gas shows reported. On the outbreak of hostilities during November 1956 the company pulled its personnel out of the country, but has since re-entered.

Following passage of the 1953 law the government granted Conorada's concession, and then halted action on the majority of remaining applications. In March 1956 an amendment to the oil law permitted applicants to offer special advantages to the nation, and applications were filed, April 2, 1956, by: Tidewater Oil Co.; Ralph E. Fair Inc., of San Antonio, Texas; Marcel Wagner (for Near East Associates); Egyptian Oil and Gas Corp.; African Oilfields Ltd.; Cooperative Petroleum Society of Egypt; International Egyptian; Sahara Petroleum Co.; Shell Oil; and Mobil Oil of Egypt. The applications cover 130,000 square miles in the Nile delta, Sinai peninsula, and the desert lying east of the Nile.

Production

Production in Egypt is centered on the east and west sides of the Suez Canal. In 1954 it declined to 37,706 b/d, and to 34,505 b/d in 1955. During 1956 it began to rise slightly, to an estimated 38,000 b/d, because of the increased international production. Most of the production has been by Anglo-Egyptian Oilfields Ltd., operator of two fields discovered since the war in the Sinai peninsula—with Socony Mobil Oil Co. and the Shell group participating on a 50-50 basis. About half of AEO's production is located on the east or "Sinai Pool" side of the Suez Canal in the declining Sudr and Aal fields; the remainder comes from the Ras Gharib field on the west side of the canal.

At the end of 1955 Egypt's oil production began to rise again because of the growing production from two new fields on the Sinai peninsula, developed by International Egyptian Oil Co. Inc. The area was formerly held by Standard Oil Co. of Egypt (Jersey Standard), which discovered the first of the two fields, Wadi Feiran, in 1949. It produces 26 API gravity crude from around 6,800 ft. The second field, Belayim, was found in 1955, where pay was struck initially at 7,350 ft, flowing around 1,150 b/d on test. This was augmented by a second well which found production at 5,130 ft of about 1,100 b/d flow. There are five Miocene producing horizons in the field, and the company expects to find a sixth. The company hopes to lift production to around 10,000 b/d, and recently installed a loading jetty at Wadi Feiran, with shipments made to the Egyptian government's refinery at Suez.

Total proved crude reserves in Egypt are estimated at 150,000,000 bbl. Egyptian sources, however, estimate reserves in the Balayim field at some 300,000,000 bbl.

Refining

Refining capacity, as of mid-1956, was a total of about 93,000 b/d, with about 6,500 b/d cracking capacity. 1955 refinery runs to stills averaged 53,500 b/d. There are two main refineries, both located at Suez on the southern end of the Suez Canal.

Marketing

Total domestic consumption of petroleum has risen sharply in recent years because of the mechanization of agriculture and Egypt's industrial progress, and now exceeds either refining capacity or production levels in Egypt.

Marketing at artificially low price levels was one of the principal grievances of companies operating in Egypt previously. In March of 1954 a settlement was announced whereby 25% of kerosine and fuel oil produced from local crude will continue at the old price ceilings; the remainder will be priced at the lowest world market levels.

Petroleum prices, as of November 1, 1955, were $0.43 per gallon for regular-grade gasoline at Cairo; $0.40 per gallon at Alexandria. On March 6, 1956 an assessment of 1.2¢ per gallon was approved by the city council of Alexandria and, if approved, would raise the price of gasoline there to 41.2 cents per gallon.

OIL LAWS

The petroleum law of Egypt was liberalized in 1953 to attract investment capital. As a special incentive to development and exploration, the 1953 law gave special terms to the western desert region and to companies applying for concessions before one year following the passage of the law. It was under this provision that the Conorada contract was signed. In March 1956 a new law was approved by the government, which authorized the Minister of Commerce and Industry to grant exploration and development contracts directly, in effect making contracts dependent on the various terms contained in the offers.

Operations under the Law 66 of 1953 are divided into three stages: reconnaissance permits, prospection licenses, and mining leases.

EXPLORATION: A reconnaissance permit is given for preliminary investigation, such as surveys, the terms of which are not defined but are to be fixed by the Minister of Commerce

TABLE I—CONSUMPTION OF PETROLEUM PRODUCTS
(Thousands of Long Tons)

	1954	1955	1956
Motor gasoline	260	275	290
Kerosine	760	815	860
Diesel oil	220	225	230
Gas oil	145	175	200
Fuel oil	1,870	2,000	2,070
Others	135	160	185
Total	3,390	3,650	3,835

TABLE II—PETROLEUM STATISTICS FOR EGYPT
(Thousands of Barrels)

		Imports		Exports		Crude Runs	
Year	Production	Crude	Products	Crude	Products	to Stills	Consumption
1929	1,868	—	3,000	—	300	1,868	4,568
1934	1,546	—	3,657	—	310	1,546	4,893
1938	1,581	800	4,417	—	287	2,381	6,511
1944	9,416	—	3,000	—	1,500	8,700	10,200
1945	9,406	—	4,000	—	1,500	8,681	11,181
1946	9,070	—	12,382	—	2,898	8,585	18,069
1947	8,627	—	10,595	—	—	8,875	19,470
1948	13,398	—	9,588	—	—	13,211	22,799
1949	15,997	—	12,122	—	—	15,571	27,693
1950	16,373	—	16,815	—	56	16,608	33,367
1951	16,311	735	NA	—	—	16,831	31,797
1952	16,464	725	NA	—	—	17,374	30,205
1953	16,501	442	NA	—	—	16,961	29,878
1954	13,774	3,598	16,578	—	—	17,102	33,060
1955							

NA—Not available. e—Estimated.

and Industry. Only general reconnaissance may be performed thereunder.

Next is the prospection license of one year, renewable on request. After the fourth year the renewal is conditioned on the operation of a drilling rig; after eight years renewal is optional with the government. Area of the license is 100 square kilometers (about 38 square miles). There is no restriction on the number of licenses which may be held by one company or person.

In the western desert special conditions obtain for the first five years following the law (until 1958), and total area for that period may be 400 square kilometers per license (about 154 square miles) with no restriction on the number of licenses held by one party.

Fiscal obligations of the holder of a prospection license include an application fee of five pounds and an annual rent. For the first year the annual rent per license is 10 pounds (28.71 US dollars), 100 pounds for the second year, and 6.25 pounds (17.93 US dollars) per square kilometer in the third and fourth years of the license until 1958, after which rent is 25 pounds (71.75 US dollars) per square kilometer. In the fifth year the rent is 5,000 pounds per license (14.35 US dollars), 7,500 pounds (21.52 US dollars) per license in the sixth year, and thereafter at an annual increase of 2,500 pounds (7.17 US dollars) until drilling is begun. Special provisions are set for the payment of rentals in the western desert.

EXPLOITATION: For former holders of the prospection license, the exploitation lease term is 30 years maximum with a renewal of 15 years.

On 50% of prospection license area, conversion to the mining lease is guaranteed, subject to special fiscal obligations. There must be one oil-producing well in the area, and the lease area is to be rectangular in shape. On the second 50% of the prospection license area, the licensee has a right to mining leases on one or more parts, with special fiscal obligations as listed below, provided he notifies the government of this intention when applying for the first 50%.

On discovery, the government has a preferential right to purchase up to 20% of crude production as well as products refined in Egypt. Price paid will be 10% less than prevailing world market price, unless a lower price is agreed upon. The lessee must first furnish a proportionate share to the total consumption of Egypt before exporting at prices not exceeding those of local oil.

Fiscal provisions of the mining lease include an application fee of five pounds, an annual rent on a per-hectare (one hectare equals about 2.5 acres) basis, and a royalty. Until 1958 royalties and annual rents on leases in the western desert which are converted from licenses are reduced to two-thirds the levels specified in the law.

Annual rent levels specified in the law are two pounds per hectare or fraction thereof during the entire development period. Royalty rates during the initial term of the concession are 15% on the first half of the converted license area, and 25% on the second half. During extension royalty is 25% throughout. Rentals are deductible from royalty.

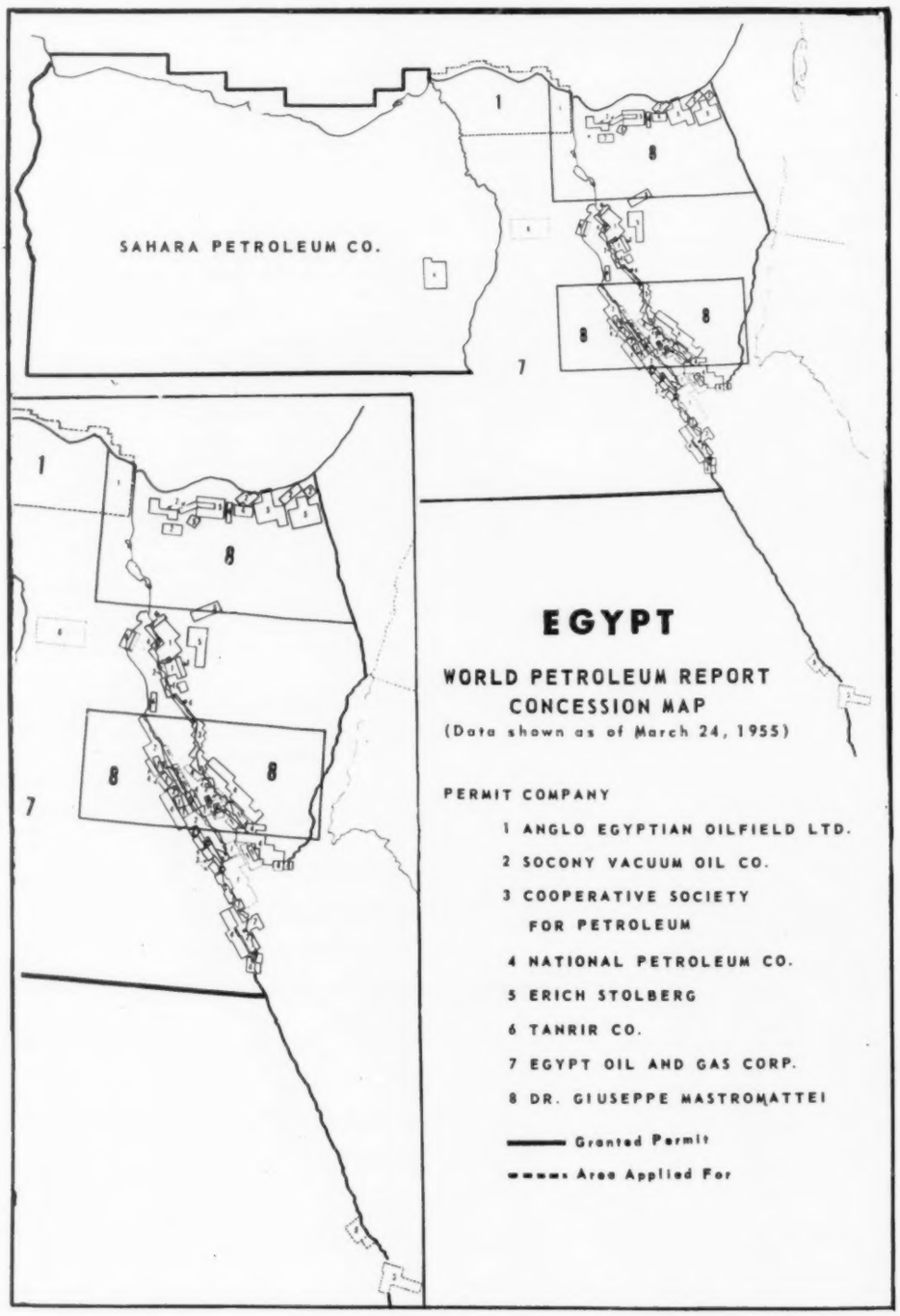
Royalty is payable in kind or in cash, price to be calculated on average world market price. Separate rentals are payable for lands outside the lease area. A guarantee deposit, of unspecified amount, must be posted by the licensee or lessee to insure performance. Leases or licenses are not transferable to other parties, unless with the consent of the government.

SPECIAL CONTRACTS: In 1954 a special contract was concluded with the government by Conorada Petroleum Corp. The duration of the contract was 30 years, renewable for another 30. The concession area was divided into blocks of about 170 square miles each, on which the annual rental was $70,000. At the end of 12 years the holdings were to be reduced to not more than 50 blocks, plus those in which oil had been found. Minimum expenditure is $1,000,000 annually; 20% of production was to be sold to the government; royalty on production is 17%.

TABLE III—EGYPTIAN REFINERIES
(As of Mid-1956)

Company	Location	Crude Capacity		Cracking Capacity
Anglo-Egyptian Oil Fields Ltd.	Suez (1)	44,000	SCA	6,500 T
Raffinérie de Pétrole du Gouvernement	Suez (2)	9,000	SA	—
	Cairo (3)	40,000	S	—

(1) 4,000 b/d thermal reforming capacity. A 2,300 b/d Platformer is under construction; complete end of 1957.
(2) 20,000 b/d distillation unit is planned for construction.
(3) Onstream end of 1956.
S—Skimming. C—Cracking. A—Asphalt. T—Thermal.



NATIONAL FACTORS

On July 26 Colonel Nasser nationalized the Suez Canal Co., in direct violation of the contract which had several years to run. This in itself was not thought to be a direct threat to the oil industry, but it foreshadowed efforts by Nasser to take control of the Middle East's oil supply. In early November the Israeli attack was backed by Britain and France, and resulted in restoration of the canal to authorities other than Egypt's. The net effect, so far as investment in Egypt is concerned, must be to discourage foreign participation and investment in Egypt. This is particularly true in view of the expropriation of Anglo-Egyptian Oilfields Ltd., which has been taken over completely by the government. END

FRANCE

Exploration and Production

An intensive exploration boom is under way in France, stimulated by recent important crude discoveries in the Bordeaux area. Besides local French companies, several foreign oil firms have applied for exploration permits in metropolitan France. Caltex (California Texas Corp., owned 50-50 by The Texas Co. and Standard Oil Co. of California) has applied through a French company FROPEX (Société de Prospections et d'Exploitation Pétrolières) in which it holds a 45% interest—the remainder belonging to Compagnie d'Exploration Pétrolière (formerly Société Nationale des Pétroles du Languedoc Mediterranean or SNPLM). Of the latter company's stock, 52.2% is owned by the French government agency Bureau de Réchèrches de Pétrole (BRP).

Standard Oil Co. (New Jersey) is operating through its French subsidiary, Esso Standard SAF, in which it holds a 63.2% interest—the remainder belonging to Gulf Oil Corp. (18.35%) and to private French investors (18.45%).

Esso Standard SAF recently assigned its exploration permit in the Aquitaine basin to ESSOREP (Société Esso de Réchèrches et d'Exploitation Pétrolières) in which it holds a major participation (89%)—with BRP (10%) and FINAREP (Société Finançière des Pétroles) as partners.

D. D. Feldman Oil & Gas Co., an American independent, whose Paris office is headed by the director-general of the French Société d'Études Pétrolières, is interested in two areas in the Rhone valley. British Petroleum Co. is exploring through its 50% holdings in Pétroles de Valènce.

A new company was formed late in 1956 by Ste. des Pétroles du Centre-Ouest, a local French company which owns 51%, and Molasse Erdöl-Forderungs AG, in which Heathman-Seeligson Drilling Co., of Kansas, has an interest. Socony Mobil Oil Co. Inc. is exploring through its French subsidiary, Mobil Oil Française. Royal Dutch-Shell group is exploring through Compagnie des Pétroles de Guyènne, in which it holds a 38% interest—the remaining shares being owned by BRP, CFP (Compagnie Française des Pétroles), and Société Anonyme d'Éxploitations Minières Pechelbronn.

The oldest and most important French-owned company is Compagnie Française des Pétroles, which applied for several exclusive exploration permits in metropolitan France through its affiliate, CFPG-CFPN. Another French company is Pechelbronn, 95% of which is owned by private investors—the remaining 5% belonging to the French government. Besides an exploitation concession in northwestern France, this company was granted several exclusive exploration permits which it assigned to PREPA (Société de Prospection et d'Éxploitations Pétrolières en Alsaçe). The French government has the controlling interest in PREPA (with 66.6% of the shares held by BRP).

The French government is actively interested in exploration through its agencies BRP and RAP, as well as through recently created financing companies, COFIREP and FINAREP, which are subsidized by the State. These four organizations participate in a number of French oil companies, among which are SNPA (Société Nationale des Pétroles d'Aquitaine), SNPLM, SPG (Société des Pétroles de la Garonne), and SAFREP. RAP also holds several exclusive permits in its own name. Cie. Française des Réchèrches et d'Éxploitation de Pétrole was formed in 1956, owned by BRP, COFIREP, and FINAREP. The latter two companies also formed Réchèrche et Éxploitation de Pétrole et de Gas, with the French mining firm Droitaumont-Bruville, during 1956.

Of these French companies, only Pechelbronn and SNPA have discovered oil in France. Although the former started commercial exploitation several years ago, the latter planned to enter commercial production in 1957 at Lacq oil field, where gas was discovered in 1953.

Esso Standard SAF struck oil in March 1954, at Parentis. The Parentis discovery came in at about 3,500 b/d from the Lower Cretaceous and

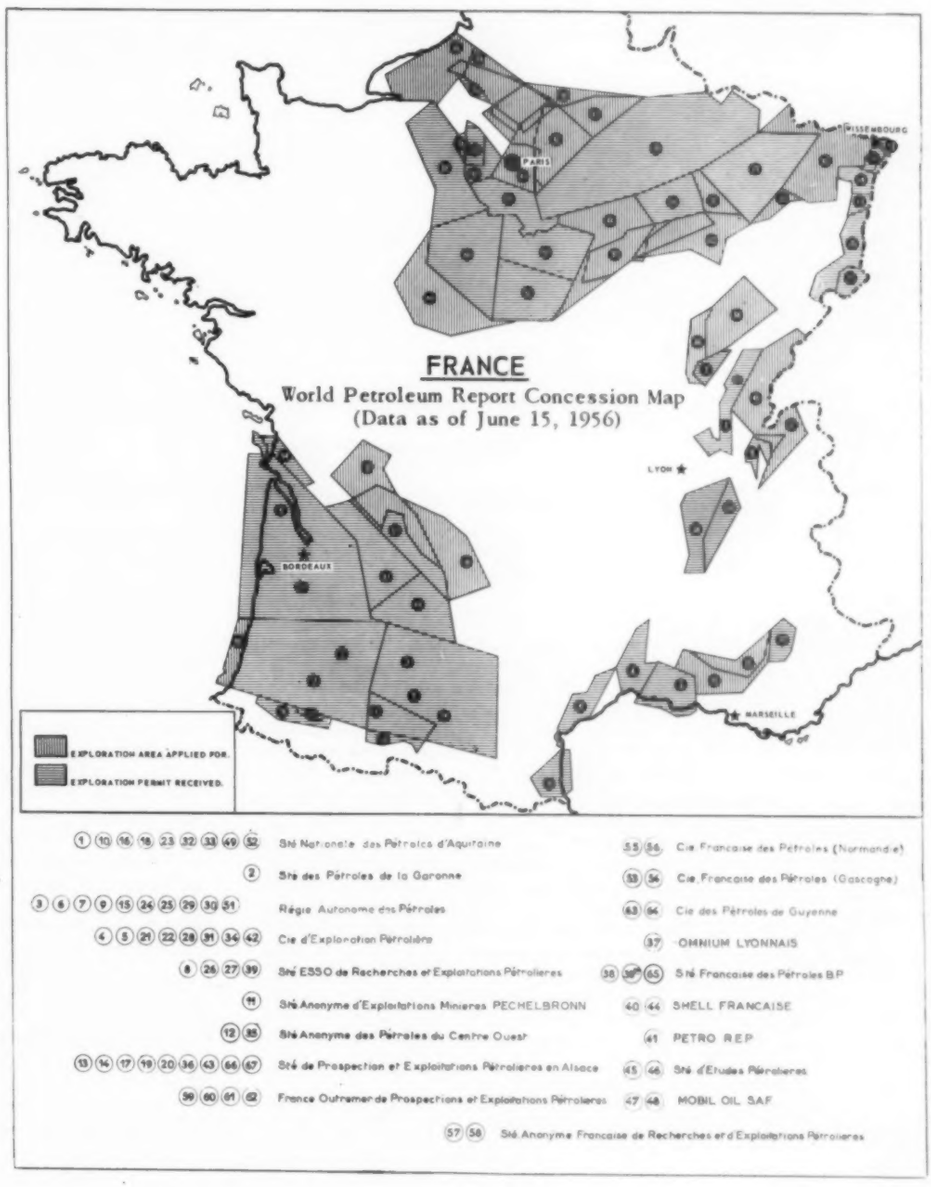
TABLE I

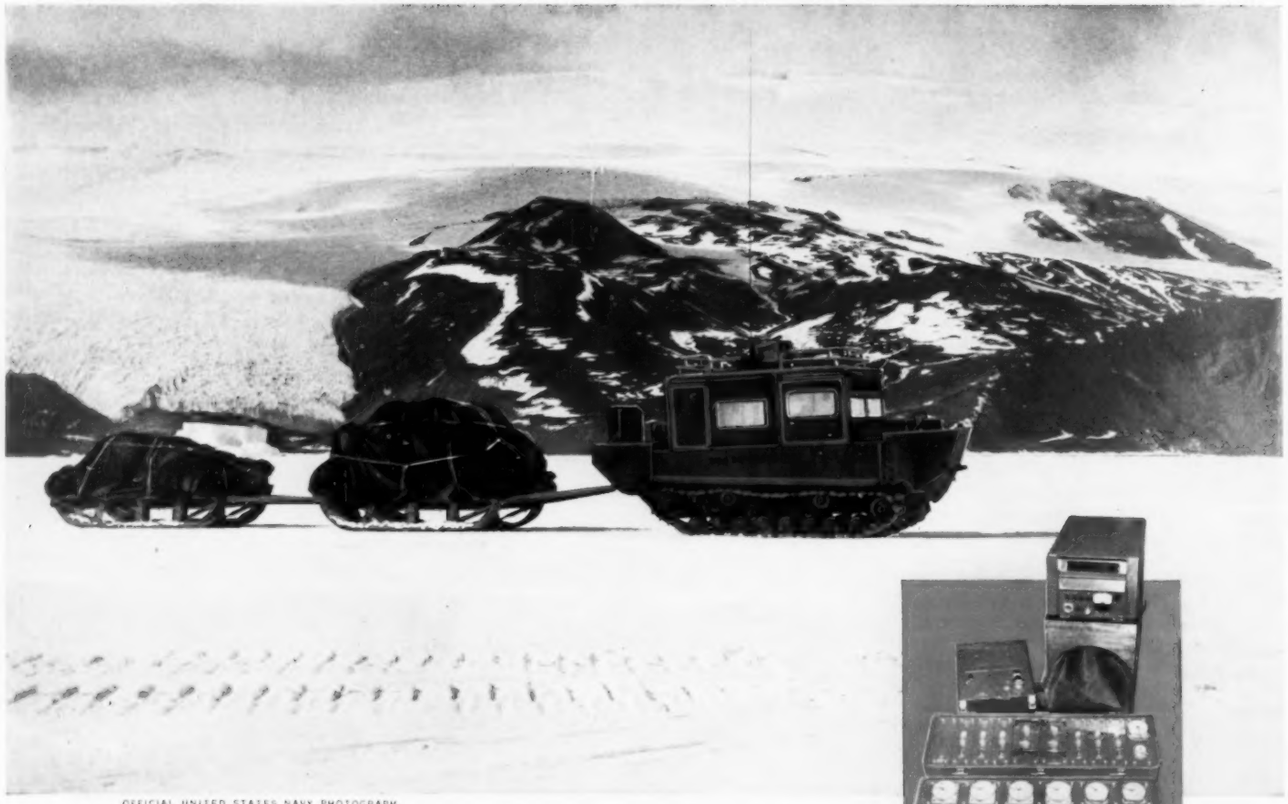
FRENCH CRUDE PRODUCTION—1956

(Thousands of Barrels Per Day)

January	20.7	July	24.0
February	20.9	August	24.8
March	23.4	September	26.3
April	23.4	October	26.0
May	23.1	November	26.5*
June	23.4	December	26.9*
		Year	24.1*

*Estimate.


FRANCE
World Petroleum Report Concession Map
(Data as of June 15, 1956)
PARIS
LUXEMBOURG
LYON
BORDEAUX
MARSEILLE
EXPLORATION AREA APPLIED FOR.
EXPLORATION PERMIT RECEIVED.
Sté Nationale des Pétroles d'Aquitaine
Sté des Pétroles de la Garonne
Régie Autonome des Pétroles
Cie d'Exploration Pétrolière
Sté ESSO de Recherches et Exploitations Pétrolières
Sté Anonyme d'Exploitations Minieres PECHELBRONN
Sté Anonyme des Pétroles du Centre Ouest
Sté de Prospection et Exploitations Pétrolières en Alsace
France Outremer de Prospections et Exploitations Pétrolieres
Cie Française des Pétroles (Normandie)
Cie Française des Pétroles (Gascogne)
Cie des Pétroles de Guyenne
OMNIUM LYONNAIS
Sté Française des Pétroles BP
SHELL FRANCAISE
PETRO REP
Sté d'Etudes Pétrolieres
MOBIL OIL SAF
Sté Anonyme Française de Recherches et d'Exploitations Pétrolieres



OFFICIAL UNITED STATES NAVY PHOTOGRAPH

7000B Portable Seismograph showing RS-8U camera, dynamotor, control panel, and one bank of six amplifiers (IGY systems have four banks of six amplifiers, or 24 traces).

7000B Seismographs selected for International Geophysical Year

U. S. ANTARCTIC PROGRAMS

GLACIOLOGISTS of the United States National Committee recommended the "all purpose" seismic systems, developed by Houston Technical Laboratories, as the best suited to exploit seismograph techniques in glaciological study during the IGY program. For this important program, operational versatility, accurate performance, and rugged dependability were the governing criteria in equipment selection.

The 7000B "all purpose" system offers three seismographs in one—a frequency range of 5-500 cps with a flip of switches. The VLF or Refraction Seismograph included in the 7000B will be used primarily to determine the velocity variations of the seismic waves in the ice sheet. The HR High Resolution Reflection Seismograph will provide accurate data on the stratigraphy and structure of the glacier and near-surface formations, while the Conventional Reflection Seismograph will supply useful deep information from the sub-glacial floor. All three methods will utilize the many filtering variations available in the 7000B to obtain the optimum signal-to-noise ratio of desired impulses.

Since each seismic traverse party will operate as a self-sufficient unit, the low maintenance reputation of the 7000B Seismograph was also an important factor in its selection. And needless to say, these seismic systems will be subjected to extremely exacting operating conditions in the Antarctic—conditions that will ask the most of equipment and men.

Houston Technical Laboratories is proud that under circumstances where *quality* counts most, the USNC glaciologists selected 7000B Seismographs.

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Upper Jurassic ages, at between 7,290 ft and 7,858 ft. By November 1956 total production from Parentis had risen to almost 20,000 b/d. Deep drilling is now being done. Parentis is located about 45 miles from Bordeaux. A second discovery, from the same Lower Cretaceous formation, was made on the Mothes structure, east of Parentis, during early 1955. Mothes is the same producing formation as Parentis, but separated by faulting.

Due to the Parentis discovery, French production rose from about 7,570 b/d in 1953 (mainly from Pechelbronn's field in Alsaçe) to 20,525 b/d in October 1955. In 1955 production averaged 16,997 b/d. There are two other producting fields: the Lacq field in the Aquitaine basin near Spain, and the Alsaçe basin, produced by PREPA—owned 9.8% by the Pechelbronn Co. and 66.6% by BRP. Another producing field may be indicated by ESSOREP from shows of 30 b/d at 6,704 ft to 6,917 ft at Lucats No. 1.

There are also 2 shale-oil plants at Autun and Séverac le Chateau which produce about 500 b/d, and a distillation plant near Saint Marcet which produces about 500 b/d of gasoline, gas oil, butane, and propane. Further, there are synthesis plants at Bethune, Lievin, and Decazeville which produce about 630 b/d.

French proved reserves are estimated by USA sources, as of January 1, 1956, at about 120,000,000 bbl. French government estimates differ somewhat, with a recent estimate by the Secretary of State for Commerce and Industry giving proved reserves as 210,000,000 bbl.

Refining

French refining capacity is far in excess of consumption, totaling 543,128 b/d crude charging capacity in 1955—with catalytic cracking capacity of 61,450 b/d. Daily average crude runs in May 1956 were 556,613 bbl, and the 1955 average was 501,800 bbl. There is a substantial surplus for export after treatment of imported oil.

Production is from a total of 13 major refineries located on the lower Seine and Étang de Bérre near Marséilles. The largest is owned by the Compagnie Française de Raffinage, followed by Esso Standard (St. Jerome), Shell Bérre, and Socony Mobil Française (Frontignan). Product output is about 50.73% fuel oils, 24.09% gasolines, 14.71% gas oils, and 1.86% lubes. Although foreign companies have a large share of refining, the Compagnie Française de Raffinage, owned by the Compagnie Française des Pétroles (in which the government has a 35% interest) refines about 28.21% of runs and has crude remaining which, in line with French government policy, is disposed of through the other companies, since it results from operations of the CFP in the Near East and represented a saving in hard-currency exchange. Esso Standard plans a 30,000 b/d to 40,000 b/d refinery, near Bordeaux, to be completed during 1958.

TABLE III

FRENCH REFINING CAPACITY

(As of July 15, 1956)

NAME OF COMPANY	PLANT LOCATION	CRUDE CAPACITY	TYPE PLANT	CRACKING CAPACITY
FRANCE:				
Compagnie Française de Raffinage	La Mede[1]	13,000	SAC	20,000 TC
	Confréville[2]	75,000	Comp.	39,000 TC
Compagnie de Raffiinage Shell-Bérre	Petit-Couronne[3]	50,000	Comp.	18,000 TC
	Pauillac	12,000	SA	—
	Bérre[4]	75,000	Comp.	10,000 C
Pechelbronn SAEM	Merkwiller	4,200	SAL	—
Raffinéries Françaises de Pétrole de L'Atlantique	Donges[5]	34,000	Comp.	17,000 C
Caltex SAF	Bac d'Ames[6]	16,500	SC	36,000 T
Ste. Cherifienne des Pétroles	Petitjean (Morocco)	4,000	SC	2,650 C
Ste. Française des Pétroles (BP)	L'Avera[7]	45,000	S	—
	Dunkerque[8]	47,000	Comp.	—
Mobil Oil Française	Notre Dame de Gravenchon[9]	17,000	SL	—
	Frontignan[10]	25,000	SC	10,500 C
Esso Standard Société Anonyme Française	Port Jerome[11]	85,000	Comp.	10,500 C
	La Mailleraye[12]	770		—

(1) 18,000 b/d thermal reforming capacity; 2,000 b/d thermal cracking capacity; and 12,000 b/d catalytic cracking capacity.
(2) 13,000 b/d thermal reforming capacity; 9,000 b/d thermal cracking capacity; and 30,000 b/d catalytic cracking capacity.
(3) 3,500 b/d thermal reforming capacity, 5,000 b/d thermal cracking capacity, and 13,000 catalytic cracking capacity. 30,000 b/d feed preparation unit, complete late 1956.
(4) 9,000 b/d thermal reforming capacity.
(5) 4,000 b/d thermal reforming capacity. 11,000 b/d Houdriformer, complete fall 1956.
(6) Under construction: Vacuum unit, FCCU and poly plant, complete 1957.
(7) 5,500 b/d thermal reforming capacity. Under construction: 50,000 b/d topping plant.
(8) 7,300 b/d thermal reforming capacity.
(9) 2,500 b/d thermal reforming capacity and 3,500 b/d catalytic reforming capacity.
(10) 2,500 b/d thermal reforming capacity.
(11) 12,000 b/d thermal reforming capacity. Under construction: 10,000 b/d catalytic cracker, complete 1957.
(12) Medicinal and technical white oil, greases, and special products.
S—Skimming. L—Lubricating. A—Asphalt. C—Cracking. Comp.—Complete. Under column heading "Cracking Capacity," type of plant is indicated: T—Thermal; C—Catalytic.

Marketing

Total civilian domestic consumption during 1955 was 301,318 b/d, of which 271,192 b/d was for the interior market and the remainder for bunkers. This consumption in the past has been about 41% heavy fuel oil and about 22% motor gasoline, despite the price of 74 US cents per gallon for high-test. The most regular rise in consumption has been in automobile fuels. The use of fuel oil in railroads is restricted by the efforts of the government to keep up coal consumption and thereby employment in the coal mines.

Consumption during 1956 is estimated to have increased 11%. Final figures for the first half of the year indicate a total of almost 19 million metric tons (including bunkers) for the year. Consumption of automobile gasolines, despite a large price increase in April on premium-grade, was up to 6,037,900 cu m; gas oil was up to 1,880,400 cu m; fuel oils (light and heavy) up to 8,502,200 metric tons; and asphalts to 872,200 tons. Bunkers were at an indicated level of 1,907,300 metric tons for the year.

TABLE II

French Petroleum Consumption—1955

(Thousands of Cubic Meters)

	Amount	% Increase Over 1954		Amount	% Increase Over 1954
Gasoline (total)	5,864.8	+12.14	Fuel oils (total)	7,884.3	+10.29
Regular	3,748.9	+ 7.78	Heavy	3,035.5	+20.37
Premium	2,115.9	+20.80	Light	4,848.8	+ 4.79
Aviation gas	179.5	+ 6.15	Lubes	427.5	+10.55
Jet fuel	99.1	+30.22	LPGas	415.8	+22.47
Special gasoline	52.8	+ 6.44	Paraffin	13.6	+17.24
Kerosine	41.8	+11.29	Waxes	2.4	+26.32
Illuminating oils	103.4	+ 5.73	Total	15,736.9	+11.78
Gas oil	1,500.1	+13.45			

Bunkers—1,748.2
Natural gas—256,025,000 cu m

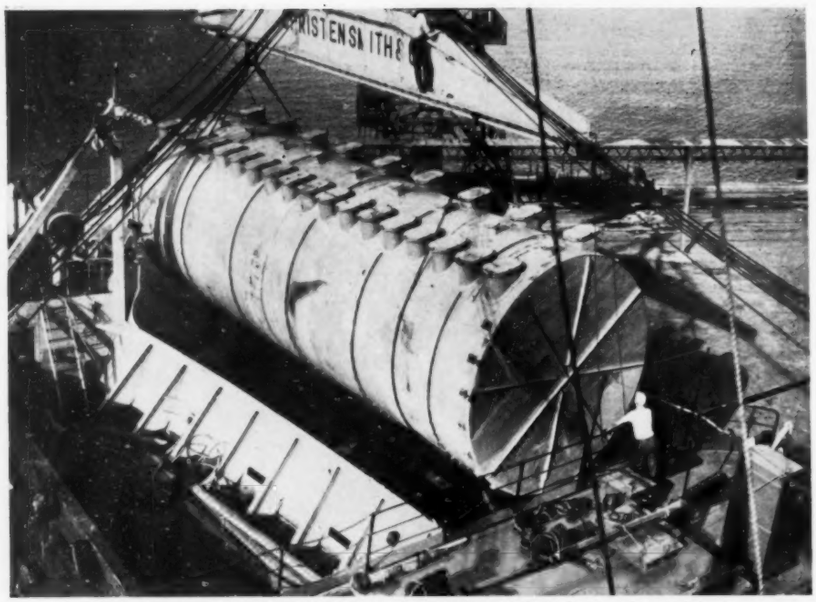
Recent Industry Developments

A recent development of interest has been the commercial production of turbodrills by Ets. Neyrpic, a French company at Grenoble. This drilling concept has been used extensively in Russia, and appears to have considerable possibilities for commercial development in the West. The French company is making an 8-stage 240-hp 10-in. turbine which has drilled, in varying conditions, to depths lower than 7,000 ft at a rate of penetration claimed to be at least 4 times and averaging 7 times faster than rotary drilling. A 7¾-in. turbine, a double turbine, and a coring turbine are now under development by the company.

In 1956 the exclusive manufacturing rights to this new hydraulic turbine were obtained by Dresser Industries—for Canada, the United States, Mexico, and Venezuela. Dresser will manufacture the Neyrpic turbodrill and bits for use with it in the areas named. Hughes Tool Co. has been employed by Neyrpic to do some research work on rock bits for application to the Neyrpic turbodrills, to be manufactured in France for Eastern Hemisphere use.

Operations of the Compagnie Française des Pétroles

The production operations of the CFP are conducted mostly in Iraq, where the company is 23.75% owner of the Iraq Petroleum Co. and its subsidiaries. The crude accruing from this share is in direct proportion to ownership, plus a recent arrangement for "overlift" or buying of other partners' shares of production, which are offered at what has worked out to be about 80% of world market prices. Liftings by CFP from Iraq production comprise about 25% of France's total imports. CFP is 35% government-owned, and has an opposite number in its refining subsidiary, Compagnie Française de Raffinage, which takes the Iraq crude for refining.



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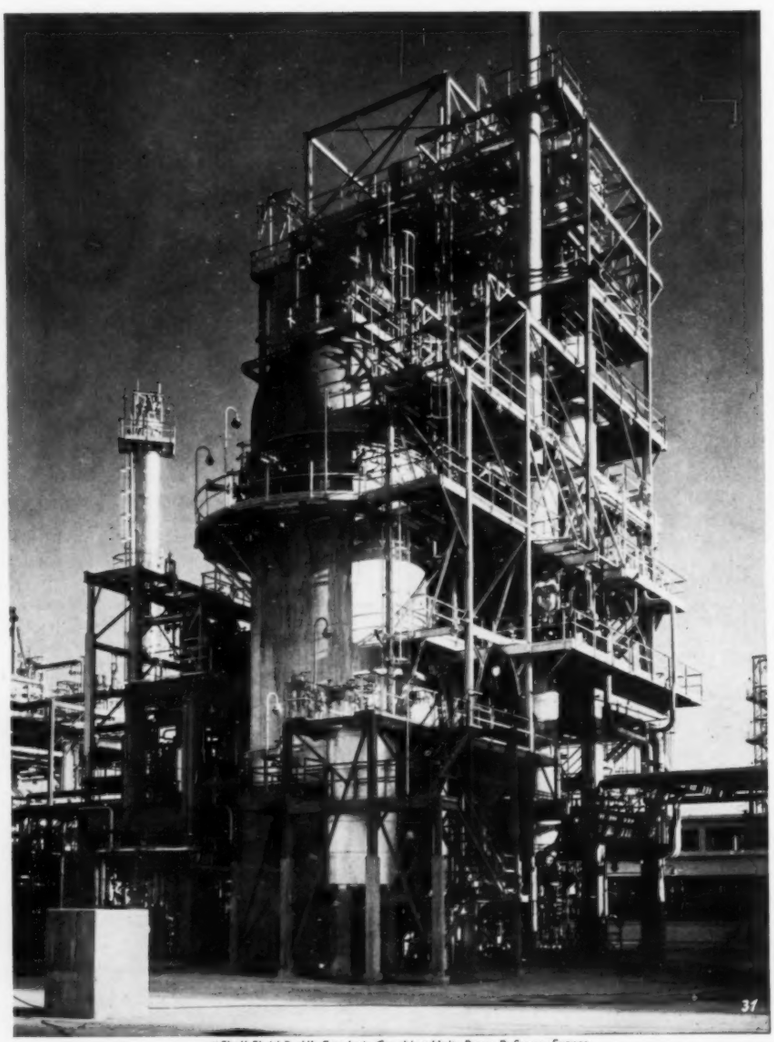

"Shell Fluid Bed" Catalytic Cracking Unit. Berre Refinery, France

Since the total share available to CFP is greater than the refining capacity of the total French group of refiners, an effort is being made to increase the sales to international groups operating in France. CFP is also active in oil exploration abroad, notably in Lybia.

OIL LAWS

The old General Mining Law of April 21, 1810 was modified on May 21, 1955 by a series of decrees giving French petroleum legislation its present shape.

In addition to these May decrees, the following were passed: Decree No. 55-1154, of August 27, 1955, regulating the exclusive exploration permits application procedure; and Decree No. 55-1349, fixing the exploitation concessionaire's obligations—in particular the rates of royalty payments.

During 1956 the petroleum law was codified into a single law, which incorporates previous laws, and is now the basic legislation for oil.

EXPLORATION: Exploration may be conducted in metropolitan France either by surface landowners or others, with the formers' permission. If such permission is refused, the ministry may grant a special authorization to search for oil. This authorization, however, must be distinguished from the exclusive exploration permit (referred to hereafter as "permit") which is granted by a State council decree and confers upon the permittee the exclusive right to explore for oil in an area specified in the permit. The grant of a permit is made entirely at the discretion of the government, upon advice of various bodies—the most important of which is the Conseil Génerale des Mines.

The applicant must prove his technical and financial capacity to carry out successful oil prospection. No other conditions are required by law; however, it has been the recent policy of the French government not to grant any permit to foreign companies which do not offer a substantial participation to French public or private capital. Each applicant also must commit himself to spend a certain amount for exploration (without any specific amount indicated in the law). The law does not provide how this amount must be spent.

The permit is granted for a maximum period of five years, and may be extended twice—on certain conditions—each time for a period of not more than five years. An exceptional extension is provided for permits, after discovery of oil, until the date of grant of an exploitation title.

The permittee is obligated to surrender to the State half of his original permit area at the first extension, and 25% of the remaining area at the second extension. He must also subscribe to a financial commitment equal to that of the preceding period.

He can assign his permit at any time, in part or in whole, but only on condition that he remit to the new permittee all geological and geophysical information on the assigned area. The same obligation applies to a permittee who surrenders his area. The surrender becomes effective only after approval by the government.

The permittee has no other financial obligations toward the State than those emanating from general taxation laws, which do not concern him until net profits have been made. He has no application fee to pay, no bonds to deposit (except a guaranty for damages to surface lands), and no surface rental. He must, however, subscribe to a commitment to the effect that he will request an exploitation title immediately after having ascertained the commercial value of a discovery.

EXPLOITATION: Except for an extraordinary exploitation authorization for discoveries during the permit period, development may occur under an exploitation permit (hereinafter referred to as "license"), or under a mining concession.

A license may be requested only when cumulative production does not exceed 300,000 tons (about 2,250,000 bbl); otherwise an exploitation concession must be applied for. No maximum concession area is prescribed, but it is understood that no concession may exceed the permit area previously held. The permittee may request as many concessions within his permit area as required by the results of his discoveries. The permit remains valid for parts of the area not covered by the concession.

The concession is granted by a State council decree, and includes the act of concession proper (indicating the area and duration of the concession granted) and a specification schedule (*cahier des charges*) containing the obligations to which that particular concession is subject. Some of these provisions must be included in

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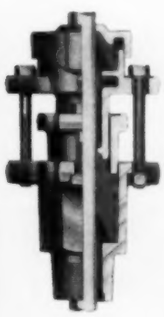

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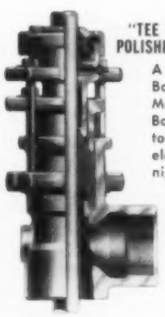

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every *cahier des charges*, including the provision that the concession applicant will form a commercial company created under French law and having a French majority on its board of directors—although exceptions may be made by the government to this requirement. Other obligations may be subject to preliminary negotiations between the government and the concession applicant. Such obligations may concern the construction or supply of refineries or pipelines, satisfaction of French domestic requirements of petroleum, exportation of production, etc. Once established and accepted by both parties, they may not later be made more burdensome for the concessionaire.

Royalty rates in France vary from 0% to 14% on production, as shown in Table IV.

TABLE IV
Royalty Rates in France

Production from:	Rate %
0 to 50,000 tons per year	0
50,000 to 100,000 tons per year	6
100,000 to 300,000 tons per year	9
300,000 to 1,000,000 tons per year	12
More than 1,000,000 tons per year	14

Royalty rates on gas are zero up to 10 billion cubic feet of annual production, and 5% on production after that point.

A depletion allowance is granted, amounting to a maximum of 50% of net income. It is conditioned on re-investment within France or the French Union within the next five years of the tax money saved through the depletion allowance.

NATIONAL FACTORS

The attitude of the French government toward foreign private investment in oil development is favorable, but conditioned on compulsory participation by the government in operating companies. The policy may be summed up by saying that industries contributing to economic development—of which the oil industry is one—are welcomed. The petroleum policy consists of a desire to: (1) increase domestic production; (2) reduce foreign-exchange content of petroleum imports; (3) diversify sources of crude supply for reasons of national security.

The level of taxation is relatively high. Two principal taxes are levied: the profits tax of 38%, payable on the difference between net assets at the end and the beginning of the taxable year; and the upstream dividends tax, which is payable by all corporations liable to the profits tax. The rate is 18% of dividends and benefits granted shareholders, bondholders, and boards of directors.

Exchange control is based on the "order" of April 30, 1940, and modifying regulations thereto. The franc has been left in the free market since September 20, 1949, to determine its rate of exchange, subject to open-market operations of the Exchange Control Office. Rates are about 349.91 francs per dollar. There is no restriction on the importation of foreign money, although all large new investments are subject to authorization by the Committee of Investment. Holders of investments made in dollars (or other hard currencies) after August 31, 1949 may amortize their capital freely at any time. If investments have been made prior to that time, capital is not transferable. Profits may be transferred in dollars on authorization of the Exchange Control Office, which is forthcoming for "normal and current payments" such as dividends and interest, net operating incomes of business concerns, or other periodic returns from investment. Permission is usually given for profits from 7% to 14% of capital invested. A guarantee for capital and profit remittances (not including production enterprises) is available through the US government.

The labor situation has improved since the response of workers to strikes called for political reasons diminished; particularly has this lessened the disturbing influence of the largest labor union, the communist-dominated Confédération Géneral du Travail. Labor negotiations are fairly free of government control since the passage of laws in 1950 which provide for collective bargaining and contracts. The cost of extra benefits—especially that of social security, which runs about 25% of base wage—is high, and totals about 47% of wages paid. These costs, therefore, must be added to the wage scales; but, as of 1953, hourly wage rates for male employees in the Paris region (which is about 13.5% higher than for other regions) ran from 40 to 42 US cents hourly for ordinary labor and 58 to 70 US cents for skilled workers. These rates, even when costs of extra benefits are added, are much lower than in the USA. END

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GERMANY

Exploration

New finds brought a reserve estimate of around 350 million barrels of proved reserves, plus 115 million barrels of probable reserves. There is a shortage of exploration prospects, however, since the level of exploratory drilling in the past has been intensive.

Wirtschaftsverband Erdoelgewinnung in its estimates of output during the next 5 years was rather conservative, anticipating a yield of about 73,250 b/d in 1960.

In some areas, especially in northwestern Germany, the limits of a promising search for oil are already outlined. Exploration in the Bavarian Molasse basin had not yet justified expectations when the first finds were made east of Munich at Ampfing and Isen. Also in the upper Rhine valley, Graben wildcatting is not showing very encouraging results. Chances of finding oil here are mostly limited to small heavily faulted block structures.

Oil companies now are considering the chances which might be offered in northwest Germany by the older sediments of Permian, Carboniferous, and Devonian age which, at depths of more than 13,000 ft, lay below the huge Zechstein salt deposits. Thus far this pre-Salinarian has not yet been reached by any well, mainly because drilling in the very thick salt formation offers special difficulties. In the northernmost oil province of Holstein-Hamburg —at the western edge of the deep Jurassic trough on the borders of which the fields Ploen, Boostedt, and Bramstedt in the south and Kiel in the northeast have been developed—a recent test, Schwedeneck 6B (by the joint interest Wintershall-Deutsche Erdoel AG), located about 11 miles east of Eckernfoerde town, encountered good oil traces in a sandstone of the Dogger beta formation at a depth of about 5,300 ft. After a short flow, the hole went to water. Testing is now in progress in a further wildcat drilled at a structurally higher location, Schwedeneck 7,a 70 b/d producer from 5,000 ft.

In southern Holstein a new pay in the Dogger delta was found in the Bramstedt field of the DEA-Mobil Oil-Preussag consortium by the extension well Bramstedt 13. The well recorded an initial yield of about 228 b/d of crude oil through a ⅛-in. choke, with a specific gravity of 0.870. In November 1956 the Bramstedt field delivered 1,600 b/d of crude oil.

In the old province of Hanover, which delivers about one-third of German crude-oil output, drilling efforts still are concentrated on the Jurassic trough of Gifhorn, the edges of which are being systematically tested for further oil accumulations.

About 7 miles northeast of Hankensbuettel field, only 1 mile off the border of the Soviet zone, the successful wildcat Lueben 1 opened a new field in the beginning of November 1955. The concession in the Lueben district is a joint interest of Preussag-Gewerkschaft Elwerath-Mobil Oil-Itag. The oil was found in a sandstone of the Dogger beta at a depth of about 4,200 ft, the initial yield being about 120 bbl of crude flowing through a 1/12-in. choke. As in so many other new fields, the Lueben structure was detected by reflection seismic investigations. Further wells were sunk in the meantime, and in November 1956 Lueben delivered 584 b/d of crule oil, with a specific gravity of 0.850.

In the western part of the Hanoverian district, Gewerkschaft Brigitta was successful in February 1956 in discovering a new oil deposit 2 miles northwest of the oil field Eilte with its exploratory well Eilte B5 in the Dogger formation—depth being about 5,600 ft. This find, which was named Eilte-West, is neither stratigraphically nor (with regard to its tectonic structure) connected with the old field Eilte at the eastern flank of the Eilte salt dome. The discovery well had been drilled through an overhang of the salt dome. The initial yield was about 189 b/d of crude through a ¼-in. choke.

A promising find was made early in June 1956 by Deutsche Erdoel AG about 5 miles southwest of Gifhorn town. The wildcat Leiferde 1 of DEA could be put into production at a depth of 2,700 ft to 2,736 ft, flowing approximately 350 b/d of crude through a ⅛-in. choke at a tubing pressure of 26 atm from a sandstone of the deeper Valendis and the Wealden Lower Cretaceous, respectively; specific gravity of the crude, 0.856. Farther north of the location, DEA had already carried out exploration work years ago. The Leiferde structure, found by Seismic Service, is limited in the east by a system of faults which connect the salt domes of Gifhorn with those of Rolfsbuettel-Hillerse. In November output of the new Leiferde field was 400 b/d.

Two other oil finds were made during the second half of 1956, farther to the west at Rietze and Hoever, respectively—both apparently of minor importance.

At Rietze, the well Rietze-Dogger 1 struck oil at 5,994 ft in a sand of the Dogger beta. Initial yield was 120 b/d through a ⅛-in. choke.

At Hoever, near Hanover town, the wildcat Hoever 10 of the consortium Gewerkschaft Elwerath-Preussag encountered the Cornbrash oil-bearing at about 2,200 ft.

The discovery of Elsfleth on the left side of the lower Weser River, made by Gewerkschaft Elwerath early in April 1956, has been mentioned previously. In this northern part of the Weser-Ems district, up to now only one small field was known, Etzel, southwest of Wilhelmshaven town. The geological conditions of Etzel, however, are quite different from those of Elsfleth—where, on the basis of reflection seismic investigations, a hitherto unknown Jurassic trough was explored. The first successful well, Elsfleth 2A, struck oil at a depth of about 5,000 ft in a sandstone of the Dogger formation below the Alb basin. The well was pumping about 70 b/d.

In July another well, Elsfleth 3—which was located 900 ft northeast of the discovery well—encountered a second pay in the Dogger gamma sandstone. This well flowed 95 b/d of crude oil through a ⅛-in. choke; specific gravity, 0.908. In November 1956 the Elsfleth field delivered 38 b/d of crude.

Two finds of apparently minor importance were reported late in 1955 in the southern part of the Weser-Ems district, viz., Vestrup and Dickel. The exploratory well Vestrup 1, of the joint interest Gewerkschaft Brigitta-Mobil Oil —located about 7 miles south of the town Cloppenburg—struck oil at a depth of about 6,000 ft on the southern flank of a structural uplift which was also detected by means of reflection seismics; the oil-bearing horizon is in the Kimmeridge.

Dickel is one of the prospects in which much drilling was done and little oil was found. In 1953 the wildcat Rehden 7 of Wintershall AG—which later was renamed Dickel 1—encountered oil and some natural gas. The well was shut in to await further exploration results. In August 1955 the exploratory well Dickel 10 was successful: and recently a further well, Dickel 11, also struck oil, in a sand of the Wealden formation. In the course of the pumping tests, each of these wells produced 31 b/d to 63 b/d from a depth of about 3,000 ft. Regular production has not been started.

In the center of the Weser-Ems district, between the older oil fields of Hemmelte-West and Dueste, 3 new discoveries were made in the second half of 1956, viz., Oythe, Ortland, and Harme—all belonging to the Oldenburg concession of the consortium Gewerkschaft Brigitta (Jersey Standard and Shell)-Mobil Oil.

Wildcat Oythe 4 was successful in exploring the Cornbrash and Malm formations at 3,720 ft to 3,800 ft. Initial yield was 62.3 bbl to 74.76 bbl crude by pumping.

At Ortland the exploratory well Ortland No. 1 found oil at 1,748 ft to 1,801 ft in the basic layers of the Kimmeridge. Initial flow was about 100 b/d through a ⅛-in. choke. The successful wildcat Harme 1, some miles east at Vechta town, yielded initially about 124.6 bbl through a ⅛-in. choke from a sand of the Kimmeridge, between 6,050 ft and 6,070 ft.

The fact that even the small Emsland district, the oil-bearing anticlines of which were systematically explored in the past 12 years, still offers chances for new finds was proved by the exploratory well Hebelermeer 3 of the joint interest Mobil Oil-Gewerkschaft Elwerath-Deutsche Schachtbau. This wildcat found some light oil in a tectonic trap structure situated at the northern flank of the syncline of Fullen at a depth of nearly 4,000 ft. In December 1955 Hebelermeer 4 encountered the same pay, i.e., the Benthein sandstone (gas-bearing) on another block of the structure. The well was shut in, and thus far only small production has been taken from the first well.

Near the Dutch border, three miles south of the Emlichheim field, Wintershall AG sunk the deep wildcat Emlichheim Z1 to test the Zechstein formation for natural gas. The well came in with a satisfactory gas flow from the main Dolomite of the Zechstein at a depth of about 9,200 ft. In June 1956 the well delivered approximately 0.5 million cubic meters of natural gas during production tests.

In southern Germany, Mobil Oil-Wintershall-Itag in autumn of 1955 struck oil near the town Landau on the left side of the upper Rhine, not far from the French border. This discovery, Landau-West 2, successfully tested 2 horizons on the Pechelbronn layers at a depth of 4,820 ft to 4,830 ft and 5,075 ft to 5,090 ft, respectively. From the upper horizon, a flow of about 220 b/d through a ⅛-in. choke could be achieved during production tests. The lower pay delivered about 190 b/d to 220 b/d through a choke of the same diameter. The crude has a specific gravity of 0.850.

A second well came in at Landau which found some oil in the lower Meletta beds also, at a depth of 4,260 ft to 4,300 ft. Structurally, the field is situated at a fault zone at the western edge of the upper Rhine valley. In November 1956 the output of Landau was 400 b/d of crude.

In the northern part of the upper Rhine valley, west of Darmstadt, Gewerkschaft Elwerath was successful in exploring 3 different small gas deposits in 1956, viz., Gross-Gerau, Wolfskehlen, and Buettelborn—with a depth of about 1,600 ft. Gross-Gerau is about nine miles

TABLE I

WEST GERMAN CRUDE PRODUCTION—1956

(Thousands of Barrels Per Day)

January	64.2	July	69.2
February	63.0	August	70.0
March	64.6	September	70.8
April	64.5	October	70.2
May	69.0	November	70.3
June	67.8	December	70.4*
		Year	68.1*

*Estimate

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north of the Stockstadt gas field. During production tests, an output of about 706 mmcf of natural gas per day was measured in the exploratory well Gross-Gerau, at a differential pressure of 10%. Here, as in Wolfskehlen and Buettelborn, the pay is in the young Tertiary.

Late in September 1956 the consortium Wintershall AG-C. Deilmann discovered a new oil deposit in the upper Rhine valley, with its wildcat Huttenheim 1, 15 miles north of Karlsruhe town. The hole flowed about 93.45 b/d of crude through a ⅜-in. choke, with specific gravity of 0.870 to 0.872.

In November, Deutsche Erdoel AG was successful with its exploratory well Minfeld No. 1 which, some miles south of Landau field, struck an oil flow in the Meletta beds between 2,660 ft and 2,713 ft. Initial yield was about 220 b/d through a ¼-in. choke.

In 1955 a total of 567 deep wells was completed in western Germany—including 107 wildcats, 77 extension wells, and 383 wells in known fields. Fifteen of the wildcats found oil or gas. Thirty of the extension wells, i.e., 39%, were successful; and 339 of the production wells, i.e., 88.5%, came in as oil or gas producers. At the beginning of 1956, 2,808 wells were producing oil and 27 natural gas.

The total drilling footage of 1955 amounted to 2,409,140 ft. For 1956, a goal of about 2.48 million feet had been set.

Refining

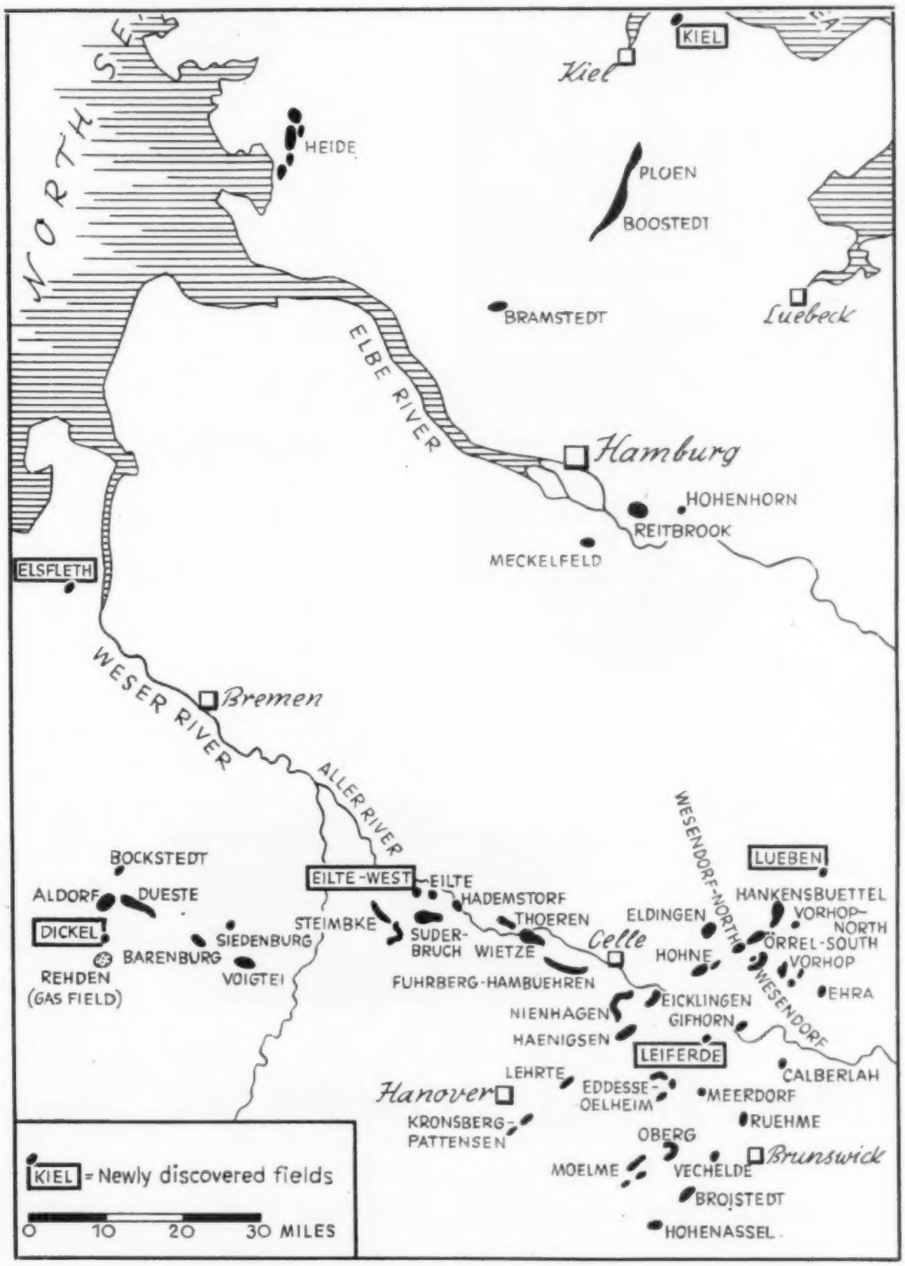
A total throughput capacity of German refineries, as of July 15, 1956, was 309,170 b/d—including about 89,000 b/d cracking capacity. Substantial new capacity is being added, according to announcements of Standard Oil Co. (New Jersey), and a new Jersey plant is under way at Cologne with an annual throughput capacity of about 20 million barrels—later to be increased to 35 million barrels. Shell is enlarging its plant at Hamburg. British Petroleum is expanding its Hamburg-Finkenwerder plant, and Socony Mobil has announced an increase of its capacity to 8.75 million barrels per day. Ruhrbau Gmbh (owned 75% by Petrofina) plans construction of a 50,000 b/d refinery at Duisburg during 1958.

Refining capacity is still lagging behind consumption, and a strong program of expansion, aimed at 460,000 b/d capacity by 1960, is under way. Refinery output in 1957 is estimated to rise by about 13.1% over 1956. About 27.2% of the input to refineries during 1957 will be domestic crude; the remainder will be imported.

Marketing

Consumption in West Germany during the first 9 months of 1956 was approximately 9.6 million tons (about 205,000 b/d), of which about 3 million tons were supplied domestically, and 6 million tons were imported. These imports were derived 2,261,847 tons from Saudi Arabia, 1,965,671 tons from Iraq, 1,067,227 tons from Kuwait, 559,398 tons from Venezuela, 110,031 tons from Mexico, 90,943 tons from Iran, and 4,595 tons from Bahrain and Qatar. The recent interruption of crude supplies from the Middle East was important to the country, since about 30% of supplies comes from Iraq Petroleum Co. pipelines which are now out of service, and 35% through the Suez Canal.

To supply growing consumption needs, 6 West German refiners—including affiliates of Jersey Standard and British Petroleum Co.—formed North-West Oil Pipelines Co. to build a 400,000 b/d crude line from the German port of Wilhelmshaven to refining centers in the industrial Ruhr area of West Germany. A 47.2% interest will be held by Esso AG. BP Benzin & Petroleum Co. (British Petroleum Co. subsidiary) will own about 26.3%, and the remainder will be divided among four German refiners. Shell group was originally included, but later withdrew. Possibly later Shell will use the planned SAPPEUR pipeline system (Marseilles-Rotterdam).



OIL LAWS

Exploration and production in Germany are conducted under the Bitumens Law, a brief but satisfactory statute. Its provisions are similar to those of Austria outside the scope of the recent Peace Treaty, which is summarized under that country's review. Another ruling statute is the Prussian Oil Decree of 1934, which recently was confirmed in German courts. It denied all claims by private landowners for royalties which, since 1934, had been paid to the German State (5%) excepting those private concessions arrived at before 1934.

NATIONAL FACTORS

The attitude of the West German government toward the investment of foreign private capital is favorable, and considerable encouragement is given to prospective investors. The high rate of business activity in Germany—one of the outstanding examples of recovery in Western Europe—has firmed up the German mark. There are few restrictions on the entry or withdrawal of capital or profits.

A trained labor force and a considerable local market, bolstered by the expanding economy, have a good effect on the investment climate. The principal drawback lies in the lack of sufficient exploratory prospects, since the intensive drilling which has been carried out in the republic since the mid-1930's to date has brought no major finds. There are prospects of extending activities into the offshore areas of the North Sea and the Baltic coast, especially in the vicinity of Schleswig-Holstein, just south of Denmark. Studies also are being carried out along the coast of lower Saxony, west of Hamburg. END

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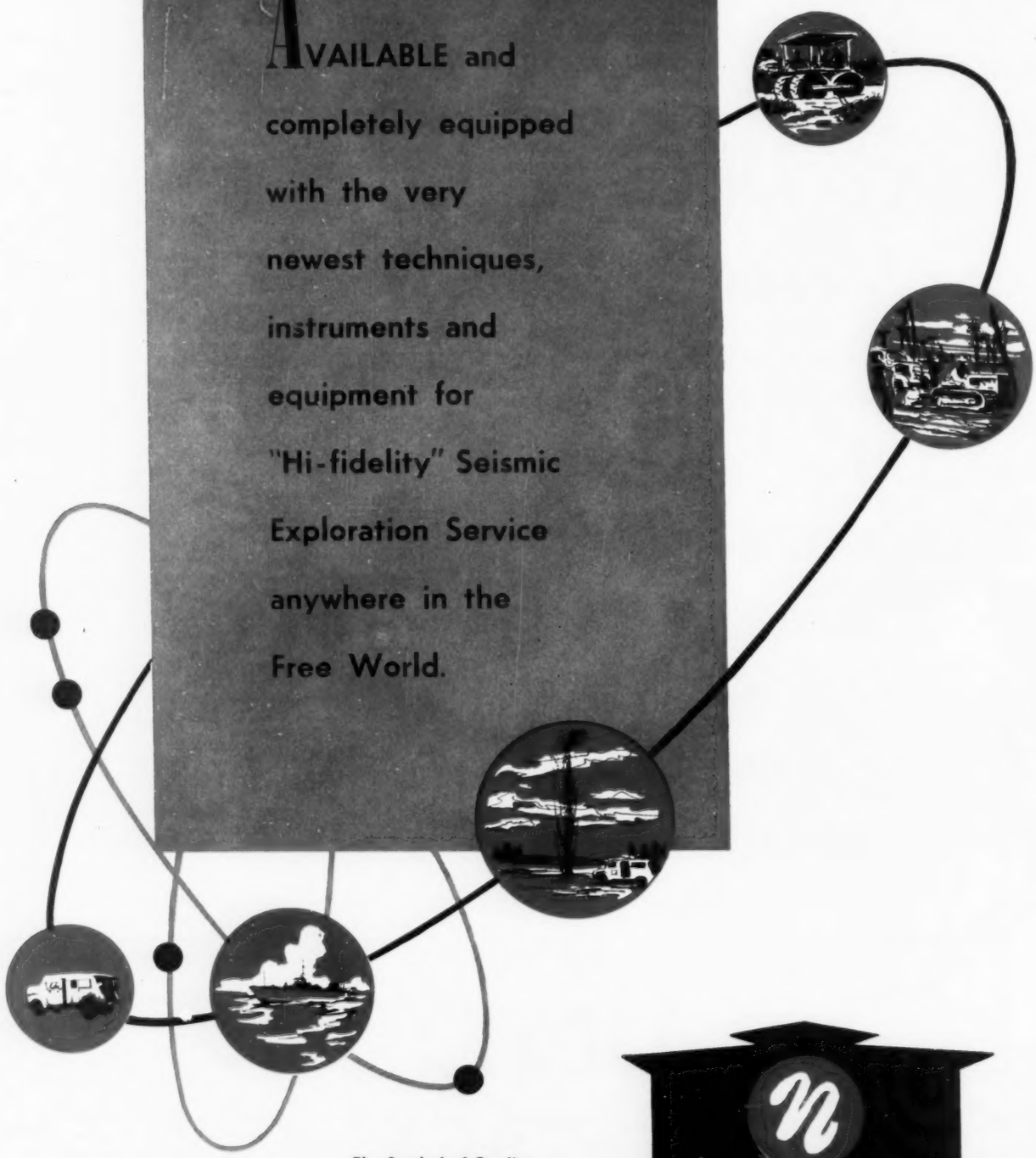

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GUATEMALA

There is no production, refining, nor transportation of crude petroleum in Guatemala. Activities are confined to marketing, and to exploration in particular. The latter is currently the phase on which attention is focused.

Exploration

The only important geological region, and the one on which most concession applications have been made to date, is the Department of Peten, the northernmost state of Guatemala. It is a flat tropical lowland country, which receives about 150 in. of rainfall yearly, concentrated in the rainy season of May through October. The total area is slightly in excess of 13,800 square miles; average elevation is about 500 ft. Exploration has been performed over the area in the past by The Ohio Oil Co., Standard Oil of Ohio, Shell, Atlantic Refining, Tidewater Oil, and others. These held exploration licenses in the post-World War II period until 1949 when, after prolonged discussion, Decree 649 was passed which contained various restrictive provisions, and all the companies withdrew.

Following passage of more favorable legislation in 1955, some 91 applications for concessions were received before the November 23 deadline from 29 companies. Archer Oil; Cia. Petrolera Guatemalteca; Shawano Development Corp.; Norman Stone, of Houston; A. K. Swann, of Indiana; Halbert & Jennings; and Garfield and Pasternack, of Denver, were declared ineligible for concessions. Following delays caused by appeals by companies declared ineligible, exploration concessions were granted rapidly. Sun Oil Co. received 600,000 acres, following settlement of overlaps with Texas Production Co. Tidewater Guatemala Ltd., Guatemalan Atlantic Corp., and Union Oil Co. received 150,000 acres for exploration in southern Peten, following settlement of overlaps with Seaboard Exploration Co. and The Ohio Oil Co. Texas Petroleum Co. received 891,800 acres near the towns of San Andres and La Libertad. Continental Oil Co. of Guatemala received rights over 394,000 acres in the Flores area of the Peten region, later to be combined with grants to subsidiaries of Ohio Oil and Amerada Petroleum Corp. to form a single unit, with the operator yet to be disclosed. In the Lago Izabal region 100,000 acres were received by Inversiones Guatemaltecas-Americanas SA, controlled by D. C. Bintliff, of Houston, and Carlos Dorion, a Guatemalan associate.

Story J. Sloan received 46,930 acres, Ohio Oil about 650,000 acres (on portions of which 50-50 joint operation agreements were made with subsidiaries of California Standard and Union Oil Cia). Petrolera California Ltd., a subsidiary of California Standard, received 67,000 acres, near Puerto Barrios; and Petroleos Guatemaltecos SA, backed by Santa Fe Drilling, received 58,500 acres in Peten.

In northern Peten, Esso Standard of Guatemala Inc. received about 300,000 acres, between concessions given to Continental and Shell companies. The Atlantic Oil Co. agreed to operate a joint 500,000-acre concession with Continental and Tidewater companies, which hold adjacent concessions. Petroleos Atlas Guatemala SA received about 250,000 acres. Sohio Caribbean Co. received about 400,000 acres, the 13th concession to be granted. Petroleum Investments Overseas Ltd., a Shell affiliate, received 500,000 acres near the border of British Honduras. Inversiones Guatemaltecas Americanas SA received about 100,000 acres in Izabal Department.

Story J. Sloan announced—late in 1956—that he had picked a drilling location on his concession which is near the border of Honduras. It is one of the few concession areas which lie outside the Peten area, and is located along the Montagua River.

The geological conditions of Guatemala, having been untested by drilling, remain in doubt. The Tertiary and Cretaceous beds which produce in Mexico are present, but the Tertiary outcrop is not so thick and the lithology of the Cretaceous differs considerably from Mexican experience.

Marketing

Domestic consumption of petroleum in Guatemala is supplied entirely by imports, principally through the ports of San Jose and Puerto Barrios. The chief supplying companies are Texas Petroleum Co., Esso Standard Oil Co., Shell Oil Co., Standard Oil of California, and Petroleos Mexicanos.

During 1955 total imports into Guatemala were 6,655 b/d. Total value was $5,382,100. Imports in 1954 were 5,375 b/d.

OIL LAWS

The previous governing petroleum legislation of Guatemala is Decree 345 of July 7, 1955 ("Codigo de Petroleo") and the regulations thereto, published October 27, 1955 (Decree 445). The regulatory agency for the government is the General Bureau of Mines and Hydrocarbons.

Decree 345 covers all phases of the petroleum industry except marketing, and its tax provisions are based on the 50-50 split of profits before foreign taxes.

The law reserves subsoil ownership to the State, but places no restriction on foreign participation in operating companies. An obligatory 30% stock offering must be made to Guatemalans at the time of formation of companies.

Exploration is divided into two phases. The first is reconnaissance, which covers all exploratory operations except drilling. Reconnaissance rights are granted in a separate permit on which no taxes are levied.

Neither are there any limits to the area covered or the length of time operations may be carried on.

The maximum exploration concession area which may be held by one person or company is 988,400 acres (400,000 hectares). The area may be divided into any number of concessions from one to ten, having an initial term of six years. This term is extendible for four more years by two extensions of two years each. There is no drilling obligation, but the extensions are conditioned on drilling being performed previously. Complete exemption from import duties is given on materials and supplies for operations.

An annual surface tax is imposed of 12.14 cents per acre for the first three years; 18.21 cents per acre annually during the fourth through the sixth years; and 24.28 cents thereafter, if extensions are given. From this, royalty paid (if any) is deductible, and exploration and development expenses before are deductible as well, up to 75% of the tax.

Minimum investment in direct exploration is 36.4 cents per acre for the entire first three-year period, 42.49 cents per acre for the fourth through sixth year period, and 16.18 cents per acre thereafter.

In the event of commercial discovery, an extra extension of five years may be added to the exploration concession. This is designed to permit the holder to define the limits of the field and select the areas desired for an exploitation concession.

The exploitation concession is automatically granted to the holder of an exploration concession who makes a discovery.

The area of the exploitation concession is set at 50% of the exploration concession, for a maximum of 61,775 acres. A single person or corporation is limited to a total of 494,200 acres, contained in one to ten concessions. An equal amount must be set aside out of the exploration concession for competitive bidding, and on this area Guatemalans have first choice; otherwise it is given to the highest foreign bidder.

The duration of each concession is set at 40 years, with one extension possible of 20 years additional, subject to the laws then in force.

The fiscal obligation of the concession calls for a 50-50 split of profits before foreign taxes. Deductions and depletion allowance permit recovery of expenditures on exploration, dry holes, and other development costs prior to production.

Income tax ranges from 5% on $500 to 43% on net income over $300,000. After this and other Guatemalan taxes are paid, there is levied a special surtax, if necessary, to bring the total level of taxes to 50% of net income after deductions.

Surface tax on exploitation concessions, payable annually, which begins at 60.7 cents per acre during the first five years, rises to $2.42 cents per acre in the eleventh through the fifteenth years. In following years the tax is $1.82 per acre. Royalty is deductible from this tax, as are the costs of exploration and development before discovery, up to a maximum of 75% of the surface tax. Royalty is 12½% of net production. The royalty is payable either in kind or in cash at "world market" prices, at the government's option.

The deductions enable the recovery of expenditures on exploration and development, as well as a depletion factor. They include deduction of development materials cost, amortization, depletion factor of 27½% of gross up to 50% of net, and intangible drilling and development costs. There is also provision for the carrying forward of previous losses for 10 years. Cost of exploration and drilling may be applied up to 75% of the exploration surtax.

NATIONAL FACTORS

A revolt early in 1954 culminated in the victory of President Carlos Castillo Armas, which substantially represented the reaction to extreme leftist tendencies of his predecessor. The attitude of the new government toward foreign investment is favorable, as indicated by the recent equitable treatment accorded United Fruit Co., a USA concern which operates plantations in Guatemala, and by the new petroleum code. The political situation at present appears stable, with President Castillo firmly entrenched and receiving considerable support from former dissident groups.

The Guatemalan unit of currency is the quetzal, divisible into 100 centavos. The quetzal is exactly equivalent to the US dollar. There are no exchange regulations over transfer of dollars or any other currency from or to Guatemala.

Income taxation in Guatemala ranges from 5% on income up to $1,000 to 43% on income in excess of $300,000.

There is no skilled Guatemalan petroleum labor available within the country which could be drawn upon by companies conducting operations. However, the productivity of Guatemalan labor is generally high in comparison with other nonpetroleum producing countries of Latin America. END

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HAITI

Exploration

Considerable exploration has taken place in Haiti in the past by the Atlantic Refining Co., in which Standard Oil of New Jersey and Seaboard Oil Co. of Delaware also participated through the Haitian Petrole Co. Drilling in the Department of Artibonite during 1944-47 included 4 exploratory wells, with no production obtained, and all the concessions were given up in 1947.

The first of the wells drilled went to a total depth of 8,804 ft, in 1944, in the central-plain region. Reportedly, the well had several gas shows from 4,400 ft down. The second well, also drilled during 1944 in the central plain, went to 9,010 ft. Oil and gas shows were reported. In 1947 a third well went to 4,099 ft in the Artibonite plain. No shows were reported in this well, and a final dry hole went to 8,064 ft in the Cul-de-Sac plain, with shows reported from 2,300 ft.

A concession covering the entire country obtained November 12, 1950 is held by Commonwealth Oil Co. of Houston, Texas. 75% of the 50-year concession has been assigned to a syndicate headed by Mark E. Andrews, half of which belongs to John W. Mecom, an independent operator from Houston. An exploratory well was drilled recently by the syndicate, according to published sources, on an island in the Gulf of Gonaves, abandoned at about 3,158 ft when drill pipe twisted off. A second deep test was drilled to below 7,500 ft, about halfway up the slope of the island, and a third is planned on the crest of what is called the Gonaves anticline.

Production, Refining, Marketing

There is no production in Haiti, nor refining. Marketing is confined to supplying the local market by imports which, during 1949, amounted to 875 b/d, of which 430 b/d were motor gasoline; 57 b/d, aviation gasoline; 123, kerosine; 252, diesel and gas oil; 11, lubricating oils; and 2, liquefied petroleum gases.

OIL LAWS

The oil industry in Haiti is governed by Decree Law 337 of December 20, 1943 (published in the official journal LE MONITEUR, December 22, 1943). Art. 5 of this law announced that "the exploitation of hydrocarbons, of coal and other combustible minerals, will be subject to a special law." Such special law not having been issued to date, provisions of the general mining law of 1943 are for the time being applicable to the oil industry. The government is reportedly working on a petroleum law draft at present.

Under this law, all substances included in the class of "mines" belong to the domain of the State. Apparently following the pattern set by the French General Mining Law of 1810, the Haitian mining law provides that no mine can be exploited except by virtue of an act of concession by the Council of State Secretaries, sanctioned by a law to that effect by the Secretary of Public Works. However, "the preliminary work of search, prospection, and sounding can be produced by virtue of a permit, accorded by the State Secretary of Public Works upon recommendation of the Bureau of Mines."

EXPLORATION: The research permit has a duration of one year, renewable and "good for the whole extent of the Republic." In addition to such permits, the Council of State Secretaries an grant, for a duration of three years, exclusive exploration permits for one or several determined substances, upon payment by the applicant of 1,000 gourdes. Such permits can only be issued to persons qualified to obtain the concessions. Holders of exclusive permits may apply for "provisory exploitation permits" which are valid for a period of one year and renewable for another year upon payment of another tax of 500 gourdes.

EXPLOITATION: The law does not give any guaranty that a permittee who discovered oil would also obtain a concession. The government reserves itself the right to grant concessions to whom it pleases, on condition, however, that the discoverer gets a fair indemnity for his expenses and a royalty not exceeding 10% of the royalty to be paid to the State.

Maximum concession period is 60 years. The concession confers upon the grantee the exclusive right of prospecting and the ownership right on products extracted. There are no nationality restrictions, but any mine concessionaires must be domiciled in Haiti. Maximum or minimum concession area is not stipulated in the law, which provides only that the concession applicant must include in his application a plan "indicating the extent of the concession wanted, as well as its perimeter." Thus the act of concession will fix, like the French law, the concession area as well as the time in which the concessionaire is obliged to begin his exploitation. The latter, once started, cannot be suspended except in the case of *"force majeure."*

Financial obligations of exploitation concessionaires include a guaranty bond of minimum 25,000 gourdes and a royalty payment set at a minimum of one gourde per year per hectare. The law does not state whether any rental must be paid; it contains only a provision to the effect that "the concession contract can stipulate that refund will be made to the concessionaire of the tax paid for the surface of any parcel of the concession effectively exploited." On the other hand, any concessionaire has the right to establish "necessary means of communications for material transport," and enjoys import tax exemption on materials required for such works.

SPECIAL CONCESSION CONTRACTS: The Haitian government uses the broad provisions of this law to cover its grants of concessions to petroleum companies. Applying Art. 54, which provides that "the principles of Civil Law are in this matter appilcable, except for the derogations, direct or indirect, which result from the dispositions of the present law," the government has granted since 1943 several petroleum exploration and exploitation concessions on terms slightly different from but within the scope of the general mining law of 1943.

A concession was granted in 1955 to Commonwealth Oil Co. of Houston. Duration is 50 years (10 years less than the maximum provided in law). The concessionaire pays a 10% royalty (the maximum amount of the royalty not being stipulated in the law). He is obligated to drill wells at stated intervals after the completion of general exploration work.

A decree published in LE MONITEUR in November 1950 gives some better idea of obligations the Haitian government intends to include in the announced special petroleum law. Provisions of this decree deal with the petroleum concession granted to Coastal Petroleum Co. and Peninsula Oil Leases Inc. They follow in general the aforedescribed dispositions of the mining law of 1943, and are summarized below.

The contract covers both exploration and development. The term for exploration is three years, with an unspecified number of extensions of three years each. Exploration area covers the entire republic of Haiti. The concession was evidently taken over or transferred to Commonwealth Oil, according to reports.

The duration of the development concession is 50 years. Maximum area is 617,760 acres, to be selected from the exploration area in 10 lots of 25,000 hectares (61,776 acres) each. Development must begin within 20 years after the development area has been selected. Exemption is given from import duties on machinery and equipment, and exports are also exempt from duty. There is an exemption from any new taxes levied during the development period, and a guarantee against increases in existing taxes.

Other rights of the concessionaire include surrender of all or part of the concession (either exploration or development area) at any time, and right to refine and transport any product obtained. There is no refining obligation. The government is given the right to receive biannual reports on work performed, including geological and geophysical data, and may inspect operations at any time. By the Mining Law, Art. 71, the concessionaire must employ and train Haitian workers after development has begun, and provide adequate hospitalization and health protection.

NATIONAL FACTORS

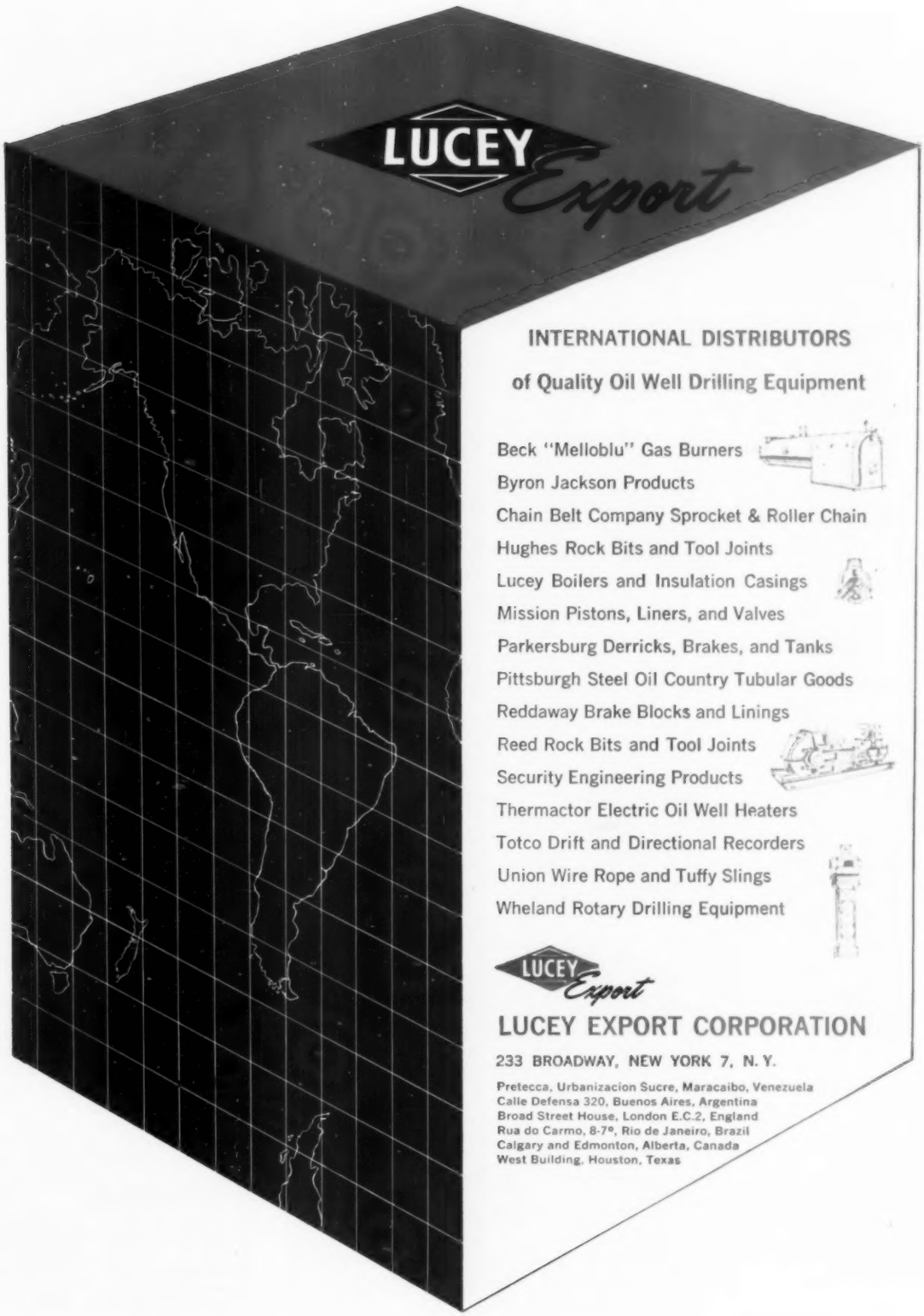
Haiti has a total area of about 10,700 square miles, including surrounding dependent islands, and comprises one-third of the Island of Hispaniola, the remainder being the Dominican Republic. The topography is very mountainous; the climate tropical, with about 55 in. annual rainfall. Population density is high; total population, about three million. Official language is French, although the mass of the people speak the Creole dialect. The economy is mainly agricultural and well diversified, depending on coffee, sisal, bananas, and cotton—in that order.

Historically, Haitian political history has been stormy, following its liberation from the French in 1804. From 1915 to 1934 Haiti was occupied by the United States; following that a succession of political disturbances was culminated in 1946 by a coup administered by a three-man military junta.

The attitude of the government toward foreign private capital is favorable, with special tax inducements given to stimulate investment. The socialist and communist parties were banned for their attitude toward foreign investment. The investment history is good. There is a legal basis, by Art. 13 of the constitution, for expropriation with compensation, but no recorded instances since 1915.

The unit of Haitian currency is the gourde, stabilized since April 1919 at 5 per US dollar, or one gourde equals 20 cents. There is no exchange control nor restriction on repatriation of capital, profits, royalties, dividends, etc., except on some minor commodities. An MSA* guarantee is available from the US government, protecting investors against currency inconvertibility and loss by expropriation.

Taxation is primarily by means of the income tax, which is payable on net income from industry and other sources. The rates begin at 5% on incomes up to 15,000 gourdes (US $3,000), and range upward to a maximum of 30% on incomes in excess of 200,000 gourdes (US $40,000). Ten percent of profits are exempt from taxation as a reserve against loss and, if profits are reinvested in an industrial enterprise, they are exempt up to 75%. By a law to encourage foreign investment, and by another law in 1956, new industries enjoy an income-tax exemption of 50% in the first year of operation and 20% in the following 4 years. In addition, the enterprise is exempt from any export duty on its products, and from customs payments on imports of machinery and apparatus. END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HONDURAS

There is no production, refining, nor transportation of crude petroleum in Honduras. Activities at present are confined to exploration and marketing.

A large concession is held by Compania Petrolera Hondurena SA, a Honduran company formerly headed by the late John L. Sullivan, president of Texon Drilling Co., and Sullivan & Garnett, of Corpus Christi, Texas. The concession was obtained in 1955, and covers about 48,000,000 acres along the north coast, of which about 16,000,000 are on land and the remainder offshore, including the continental shelf extending 30 miles out.

An exploratory well is currently being drilled at Tusi Viejo, near the southern coast on Laguna de Cartina, about 80 miles from the Nicaraguan border. The company is reportedly also interested in an offshore area some 5 to 12 miles off port La Ceiba at a depth of about 150 ft.

In March 1956 this concession was transferred to John W. Mecom and associates of Houston, Texas. According to reports, approximately 15% was retained by the Cia. Petrolera Hondurena. The current well is scheduled to go to 4,500 ft, and another rig is to be brought in shortly.

During 1956 a concession over about 10.3 million acres was granted to Lester Foran and Lynn S. Holmes of Texas. No drilling has been reported as yet. The concession covers the Departments of Olanche, northeastern Honduras, and Santa Barbara in the northwest. The group was given a year for preliminary operations and reconnaissance to explore the widespread Cretaceous sediments thought to underlie about one-third of Honduras. There are numerous oil and gas seepages in the country.

Little other exploration has been conducted. Anglo Persian Oil Co. Ltd. is reported to have drilled 2 exploratory wells to about 500 ft before World War I. One was near Juticalpa in the state of Olancho, and the other near Omoa on the northern coast. Seepages and other petroleum indications have been reported frequently, including a report that United Fruit Co. encountered oil in a water well near Puerto Cortes as well as a report of interesting manifestations northwest of Santa Rosa de Copan, in western Honduras near Guatemala.

Marketing

Since there is no domestic production, all requirements within Honduras are satisfied by imports. The principal ports used are Tela and Puerto Cortes on the Caribbean, and San Lorenzo on the Pacific. Principal supplying companies are Esso and Texaco.

Imports provide the best indication of domestic consumption of petroleum. During 1953 (latest year for statistics) imports were as follows (figures in metric tons): kerosine, 2,370; diesel and other fuel oils, 128,932; asphalt, 158; gasolines, 25,612; greases and lubricants, 10,024. Their total value was $3,649,200.

OIL LAWS

On March 8, 1954 a new petroleum law was published, known as Decree 107. A revision is currently in progress. All points not covered by the petroleum law remain subject to the mining code.

A single concession contract is given, which covers exploration with the right to select exploitation concessions and to produce therefrom. Duration of the exploration concession is 20 years maximum. On expiration, the holder has the right to another, provided he has fulfilled his obligations.

Transfer or surrender of a concession to another concession holder is forbidden. Maximum area, either for exploration or exploitation, is 500 hectares (about 1,250 acres), with no limitation on the number of concessions which may be held by one company or individual.

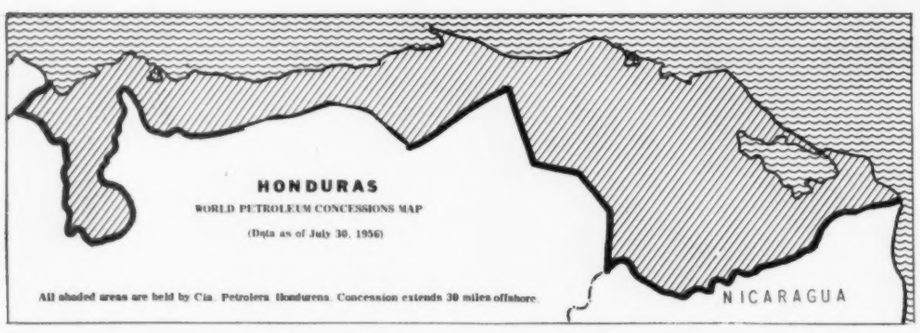
A drilling obligation is imposed which stipulates that a rig must be installed and working within the first 12 months of the concession term.

Surrender of a concession requires governmental approval, and the government is given the right to buy equipment located thereon at depreciated cost.

Fiscal obligations of the concession include an unspecified surface tax and a royalty, in addition to general taxes. The annual surface tax specified in the mining code is one lempira (49.5 US cents) per hectare. Royalty is 5%, payable in kind or in cash, with provision of 2% royalty payable to the landowner. The State is given the right to 25% participation in profits of the company, of which 2% goes to the municipalities and districts concerned. All concessionaires are given 10 years' exemption from import duties on the materials and supplies imported.

TRANSPORTATION AND REFINING: Concessions may be given for pipelines and refining. Pipeline concessions may be either private, for use of the concessionaire only, or public, in which latter case they are subject to government rate scales and will receive government stimulation. Private concessions may only be given to holders of exploration, exploitation, or refining rights. However, whether public or private, they may be required to transport government oil up to 50% of capacity. No special taxes are given in the law.

CIA. PETROLERA HONDURENA CONCESSION: The existing concession contract in Honduras follows the law closely, according to press reports. The company is obligated to build, on discovery of commercial production, a public school and hospital for its employees and their families at the nearest large community and to provide low-cost housing for Honduran workers who must comprise at least 75% of the payroll. Disputes over the interpretation of the concession are to be settled by Honduran courts. Other specifications are similar to the petroleum law, and their application shows that the surface-tax payments are not considered as contributing to the government's 25% share in profits. The status of royalty payments in this regard is unknown.


HONDURAS
WORLD PETROLEUM CONCESSIONS MAP
(Data as of July 30, 1956)
All shaded areas are held by Cia. Petrolera Hondurena. Concession extends 30 miles offshore.
NICARAGUA

NATIONAL FACTORS

Among the factors bearing on investment favorability in Honduras is the tax and exchange situation. Tax rates range from 3% on 5,000 lempiras (about $2,500) income to 30% in excess of 1,000,000 lempiras (about $500,000). Depreciation allowances range from 2% to 20% annually, with rates for machinery about 5%. There is no dividend tax.

The unit of currency is the lempira, which has been steady at 49.5 US cents per lampira (2.00 lempiras buying and 2.02 lempiras selling per US dollar) for some time. There are no restrictions on the investment or export of capital or profits, and no exchange control. A recent convention has been concluded with the United States which gives guarantees against exchange inconvertibility and expropriation. There are no known instances of expropriation.

Politically, the country has been under the influence of General Andino for many years. The recent elections showed a marked communist influence, and the largest industrial enterprise in the country, the United Fruit Co., has had considerable difficulty, including a 68-day general strike during 1954.

On October 21, 1956 a military coup occurred which transferred political power to a three-man military junta, when Colonel Hector Caraccioli forced the resignation of Julio Lozano Diaz, the former chief of State. A new cabinet of ministers was formed immediately to discuss problems confronting the government. It appears that the coup was more than a transfer of political power, since the junta has extensive plans for economic reform and development. Plans have been made to release the government-operated railroad, water, and light companies to private control, and to encourage foreign investment in development of natural resources.

The junta is not identified with any of the political parties of Honduras, such as the liberal, nationalist, or reformist group. It is reportedly considering a return to a constitutional form of government through election of a constituent assembly during 1957, via a referendum rather than a general election.

Available labor within the country is limited. Wage rates average considerably lower than in the United States. There is little labor legislation or unionization in Honduras, and no minimum wage scales.

No restrictions are placed on foreign investment within Honduras nor on foreign ownership of corporate shares. The constitution provides (Art. 155) that full alienation of national ownership may not occur in . . . "Zones within 40 kilometers of neighboring countries or the coasts of both seas, islands, keys, reefs, rocks, cliffs, and sandbanks . . ."; and, although foreigners are prohibited by the mining code from owning these lands, there is no prohibition against operations in the petroleum law; the concession currently in force covers such areas.

END

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INDIA

Petroleum production in India was obtained until 1953 from a single field, Digboi, in the state of Assam in the extreme eastern part of the country. The field, which was discovered in 1890, has produced about 30 million barrels, and current reserves are estimated at 30 million barrels. Production, which has been virtually constant for a number of years, was 6,100 b/d in 1955 and 6,215 b/d in June 1956.

Operations at Digboi are in the hands of Assam Oil Co. Ltd., a wholly owned subsidiary of The Burmah Oil Co., which has carried out extensive exploration in other parts of Digboi structure. The only other company searching for oil in India is the Standard-Vacuum Oil Co., which has carried out an aerial survey of the Bengal basin area of India and East Pakistan.

Standard Vacuum has a concession for exploration of about 10,000 square miles. An exploratory well is planned, in the Bengal basin, in the near future.

The Indian government recently received the aid of a team of Russian oil advisers from the Soviet government. Two Russian drilling rigs, plus one Romanian rig with the services of 88 technicians for 6 months to train Indian personnel, were included. Total cost of the arrangement was 1.8 million dollars, and for an additional $220,500 the Russians will carry on the training for 6 months. Seismic equipment will also be supplied for $42,000.

The team of Russian advisers outlined an extensive program of exploration for the Indian government's 5-year plan. It included 34 deep exploratory wells during the 5-year period, with a total footage of 464,500 ft, plus a start on 6 more wells; 17,250 miles of seismic profile shooting; and drilling of 145 shallow tests with a total footage of 500,000. Exploration was recommended in the Punjab and Rajasthan basins, with a survey and core-drilling work in the Cambay region of western India and on the Madras coast; deep exploratory drilling in the Ganges valley of West Bengal; more exploratory drilling in 5 Punjab areas and in Rajasthan; and setting up 14 gravity, 10 seismic, and 15 geological parties, and 10 drilling crews.

Private USA and Canadian companies have shown interest in Indian exploration, according to the government, which announced recently that Schlumberger Well Surveying Corp. would be commissioned to conduct seismic and gravity surveys in Rajasthan.

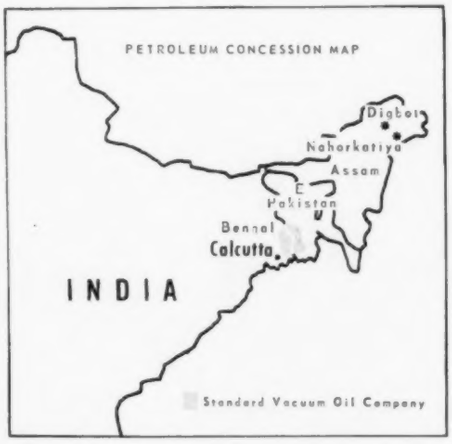
Exploration activities, carried out in the Digboi area by Assam Oil Co., were unsuccessful prior to 1953 because of the complicated geological structure. Early in 1953, however, oil was found at 9,700 ft at Nahorkatiya, about 20 miles southwest of Digboi. Four sands have been tested, and commercial production was begun in February 1954. Assam Oil Co. is also reportedly preparing to carry out an expanded program of geophysical work east of Digboi, including additional gravity surveys, an aerial magnetometer survey, and reflection seismic work over a 5,000-square-mile area.

Reserve estimates at Nahorkatiya have recently been revised upward. The chief geologist of Assam Oil Co., W. B. Metre, recently stated that the field is capable of producing 2,500,000 tons yearly (about 50,000 b/d) of crude, plus 45,000 mcf of gas for the next 20 years.

A local company, Birla Bros., has made application for a concession covering primarily the desert areas in the northwestern state of Rajasthan. The application is under study by the government.

The Assam Oil Co. Ltd. has 4 concessions totaling about 450 square miles which have been a source of dispute with the government. The latest arrangement, made during August 1956, entailed separation of the company's refining and exploration activities, and formation of two separate companies. One would be owned two-thirds by the government, and would conduct refining. The other would be owned two-thirds by the company, and would conduct exploration and production. Two of the four concessions have already been settled, and call for a one-third government share in the 165-square-mile concession at Moran and the 280-square-mile concession at Hugrijan. The other two, one of ½ square mile at Nahorkatiya granted in 1951 and the 64-square-mile area called the Nahorkatiya extension granted in 1954 and surrounding the smaller area, grant the government right to one-fourth participation.

MARKETING: Consumption within India during 1955 totaled about 97,520 b/d, estimated to rise to 138,920 b/d in 1960.



OIL LAWS

Oil operations are governed by "The Petroleum Concession Rules, 1949" which became effective in January 1950. The petroleum concession rules have been substantially modified recently, and a bill to modify them further is at present being considered by the government. This modification is being done separately from considerations in India's mining lease rules, which cover mining other than petroleum.

Under the petroleum concession rules, exploring licenses are granted for two years, with the licensees entitled to two renewals of one year each. Prospecting licenses are granted for three years, with two one-year renewals. A mining lease is granted for 20 years renewable, at the option of the government, for a period not exceeding the original lease. Each lease is limited to 1,000 square miles. Operators have a guaranteed right to convert an exploration license into a prospecting license, and a prospecting license into a mining lease.

Annual rents during exploration amount to one rupee ($0.21) per square mile. Payments during the prospecting period are between 8 annas and one rupee ($0.105 to $0.21) per acre per year. During exploitation a surface rent is payable, in addition to a royalty. The latter is set at 10% on all crude oil and natural gas extracted. It is determined on the basis of the "wellhead value," defined as the published price of crude oil in a "substantial free market" in any part of the world, with suitable adjustments for transportation differences.

STANDARD VACUUM CONTRACT: An agreement was signed in 1953 between the Indian government and the Standard Vacuum Oil Co. for joint exploration and exploitation of a portion of the Bengal basin in eastern India. The exploratory area covered by the new agreement consists of 10,000 square miles of the Ganges delta, north of Calcutta. Under the agreement the government provides one-quarter of the investment for exploration work up to a maximum of $5,243,000. Details concerning production will be negotiated if petroleum is found in commercial quantities. The company is in charge of the joint operations, with each of the parties nominating an official to review the program from time to time. Standard Vacuum has given its assurance to consider operation of a refinery with a minimum daily capacity of at least 10,000 bbl if commercial oil production in sufficient quantity is established. (This would be in addition to the company's 25,000 b/d refinery near Bombay.) Profits (apart from the government's proportionate interest) will be divided on a 50-50 basis.

NATIONAL FACTORS

The factor limiting investment in India has primarily been the attitude of the government.

Government spokesmen have declared that India would retain a mixed economy, but the public sector would exercise greater leadership in planning and would also increase its activity in those fields of endeavor reserved to the State under the basic industrial policy resolution of April 6, 1948. In certain cases, where the government found it expedient to allow private enterprise to develop key industries in the reserved field, the government would retain financial control.

This attitude was reinforced by an amendment to the constitution which permits the government to expropriate certain industries without compensation. Among the specific industries mentioned in the amendment was "the cancellation or modification of any rights . . . lease or license for the purpose of searching for or winning, any mineral or mineral oil, or the premature termination or cancellation of any such agreement, lease or license."

India's attitude was heightened by recent statements of K. D. Malvivy, the head of the Oil Directorate, the new agency in New Delhi which was recently set up to take charge of oil operations. In all future negotiations the government will insist on 51% ownership of exploring and producing companies, it was announced. The same participation is enforced on new refineries in India.

END

Table I—Indian Refineries
(Barrels Per Day)

Assam Oil Co.	Digboi	5,900 SC	1,500 T
Burmah Shell Refineries	Bombay (1)	40,000 SCA	13,000 C
Standard Vacuum Co. of India	Bombay (2)	30,000 Comp	5,100 C
Caltex Oil Co.	Vishakt-man(3)	13,500	

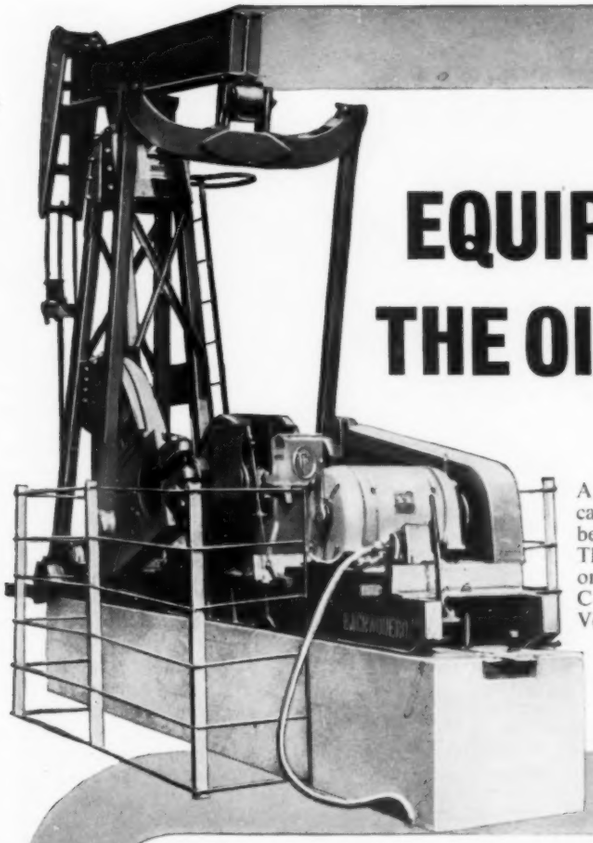
(1) 6,700 b/d catalytic reformer, 7,300 b/d Edeleanu plant under construction; complete third quarter 1957.
(2) 4,200 b/d thermal reforming capacity.
(3) Under construction; complete 1957.
S—Skimming. C—Cracking. A—Asphalt.

TABLE II
INDIAN CRUDE PRODUCTION—1956
(Thousands of Barrels Per Day)

January	6.0*	July	6.2*
February	6.3*	August	6.3*
March	6.4*	September	6.0*
April	6.3*	October	6.1*
May	6.3*	November	6.0*
June	6.2	December	6.1*
		Year	6.2*

*Estimate.

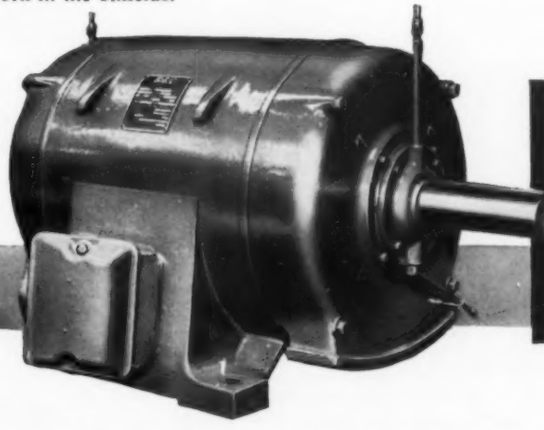
EQUIPMENT FOR THE OIL INDUSTRY



A high torque squirrel cage motor driving a beam type well pump. This installation is on one of the oilfields of Compania Shell de Venezuela.

A combined circuit breaker and contactor starter for the automatic control of oilwell motors.

A G.E.C. weatherproof motor designed and built for arduous work in the oilfields.



BY G.E.C.

THE GENERAL ELECTRIC CO. LTD. OF ENGLAND

INDONESIA

Exploration, Production

The development of the petroleum industry of Indonesia has been slowed by the young republic's struggle for a stable government.

Exploration, which first began more than 60 years ago, brought in commercial oil fields at Telaga Said Darat, in north Sumatra, in 1883 when Royal Dutch Shell first found light crude at shallow depth. The fields of northern Sumatra produced nearly 24 million barrels of oil up to World War II. They are still producing today, but since damage and occupation by the Japanese they have not been returned to Shell's control and, instead, are being operated by the government—including the Brandan refinery. Inadequate capital and experience have not permitted the fields to realize their full potential.

Since the end of World War II, a moratorium has been declared over existing petroleum rights. The three companies involved are owned by the Shell group, Standard Vacuum, and Caltex. Although their rights are not running out—inasmuch as the moratorium "suspends" them—the companies are restricted in operations to acreage held before World War II.

Exploration prospects in Indonesia are encouraging, and offshore prospects appear particularly so. Marine waters in the South China Sea are generally shallow, and operations could be carried out in large offshore areas off Sumatra, Borneo, and Java.

Onshore prospects are good also on the republic's more than half million square miles of acreage, although the majority of the area has been looked over. It is estimated that half the potential onshore production has yet to be found. Potential areas are found in some coastal regions in Borneo, and in Java and Sumatra. Oil seeps occur in Celebes, which has a favorable Tertiary section.

The principal recent exploratory discovery is the Minas field, of Caltex. This field was mapped by Standard Oil Co. of California before World War II and drilled when Caltex re-entered the country after establishment of the republic in 1949. Production is rising rapidly, and soon it may be the principal field in Indonesia. Crude currently is being piped to river terminals and shipped down to marine terminal.

Crude production during 1955 totaled 236,861 b/d, of which 107,529 b/d was by BPM (Shell), 68,037 b/d by Standard Vacuum, and 61,295 b/d by Caltex. During 1956 production mounted slightly, to an average estimated at 254,000 b/d. Most of this increase is due to the Minas field, which was up to 74,241 b/d early in 1956. Natural-gasoline production was 2,462,000 metric tons during 1955, equivalent to about 49,240 b/d.

Total footage drilled during 1955 was 441,730, in 133 wells.

Refining

There is a total of 5 major refineries in Indonesia, with a combined capacity of 230,000 b/d. Only Caltex has no refinery in the country.

Crude runs to stills during 1955 totaled 11,046,143 metric tons (about 220,923 b/d)—an increase of about half a million tons over 1954.

Transportation

The major development in transportation has been the construction of a 90-mile crude line to deep water from Lirik field of central Sumatra, by Standard Vacuum. The line is heated to keep the crude—which is waxy and has the extremely high pour point of 105 F—flowing. The line will be complete during 1958, and will have a capacity of 20,000 b/d. Meanwhile about 2,000 b/d is being run through a 6-in. line to Djapura, on the Indragiri River, where it is put into barges equipped with heating coils and loaded on ocean-going tankers at Tjenako.

Consumption

Consumption within Indonesia during 1956 rose about 6.7%, to approximately 80,000 b/d of crude equivalent. Use of both gasoline and kerosine is up considerably.

OIL LAWS

The present controlling law in Indonesia is the old mining code of 1890, with numerous amendments. However, since the end of the war, exploration rights of the companies in the country have been placed in moratorium; and Shell was excluded entirely from its holdings, pending the passage of a new law. This law reportedly is to be based on the 50-50 profit-sharing concept, and representatives of the Indonesian government have been consulting with other governments, including that of Venezuela. They also have requested advice from the US Department of State and the United Nations.

At present operations are conducted under four types of petroleum rights. The first of these is the prospecting permit, which carries rights to reconnaissance and stratigraphic drilling. The second is the "5A" exploration concession, which has a 6-year duration. It may be followed by the "5A" exploitation concession, which has a 40-year term. Also some older mining concessions are held; these have a 75-year duration. Although operations are now in moratorium, exploration and production are permitted on existing holdings.

NATIONAL FACTORS

Political instability has prevented faster development of Indonesian production. The Republic of Indonesia was established after World War II, at the end of the Japanese occupation. The Dutch formally recognized Indonesian independence in the 1949 treaty; but, early in 1956, this treaty was abrogated unilaterally by Indonesia, and the Indonesian debt to The Netherlands was repudiated—a disturbing act to companies interested in oil investment.

Oil fields in northern Sumatra held by Shell, which were nationalized following World War II, have not yet been returned to the company. Currently these fields are producing very little, and the Shell group has offered to make substantial investment in Indonesia if their return is effected, i.e., with sufficient guaranty of a workable oil law and a stable government.

Shell also has requested the institution of the 50-50 profit-sharing arrangement. The present division of profits is said to be considerably less favorable to the company.

During 1956 a special committee, under the chairmanship of Vice Premier Mohammed Roem, was set up to study the return of the concession to Shell. An understanding reportedly was reached for 50-50 ownership between the government and Shell, with a new operating company to receive a concession until the year 2000. The reports were unofficial, and later were denied by the government.

A major consideration in Indonesia has been the taxation problem. The level of income taxation is high, as are the import duties and internal excise taxes. Income taxes range from 40% on about $43,850 to 52½% on profits in excess of $219,250. Dividends are subject to a 66⅔% remittance tax on exchange transfers. A recent development is the imposition of a 40% compulsory profits-retention tax. This definitely applies to oil-marketing companies, but its application to producers has not yet been defined.

Within Indonesia the level of customs duties is exceptionally high, especially on imports of automobiles. The price of gasoline has been increased by an additional rise in the excise duty, which raised the price to 39.5 cents per gallon, from 16.5 cents, in the spring of 1955.

The increased taxation made it difficult for Indonesian petroleum to remain competitive. The problem fundamentally is one of education of the responsible government officials to the value and problems of the petroleum industry. How effective the companies may have been in this direction remains to be seen. Some indication may be obtained when the new petroleum law has been promulgated—especially when the issue of Shell's confiscated properties has been settled. END

TABLE I

INDONESIAN CRUDE PRODUCTION—1956

(Thousands of Barrels Per Day)

January	241.1	July	254.7
February	255.1	August	259.5*
March	257.4*	September	259.4*
April	251.2*	October	255.0*
May	251.2*	November	256.1*
June	251.2*	December	257.0*
		Year	254.0*

*Estimate.

TABLE II

REFINERY RUNS IN INDONESIA—1955

(Metric Tons)

Aviation gasoline	291,238
Motor gasoline	2,280,900
Turpentine	99,222
Kerosine	1,538,966
Diesel oil	2,317,287
Residual fuel oil	3,683,457
Lube oil	21
Others	843,441
Total	11,046,143

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IRAN

Exploration

Exploration in Iran resulted in the first producing well in the Middle East during 1908, at Masjid-i-Sulaiman about 150 miles inland at the head of the Persian Gulf. Subsequently several large producing fields were found along the Bakhtiari range, as covered later.

During 1955 activities were confined to rehabilitation of existing facilities, and no exploration was conducted by the consortium. During 1956, however, considerable exploratory activity was under way. The consortium [see paragraphs on "Oil Laws," hereinafter, for composition of consortium] drilled what was reportedly a successful exploration well near Ahwaz in 1956.

The government's Iran Oil Co., which is 100% owned by National Iranian Oil Co., is responsible for exploration outside the consortium area. The company conducted an active drilling program during 1956, and has drilled a number of wells at Qum, 80 miles from Teheran. During August 1956 Qum No. 6 struck light crude of about 32 API gravity at about 8,727 ft and went wild, blowing about 50,000 b/d into the air. The well flowed several million barrels before it was brought under control; and, even when choked back to some 3,200 psi, it was estimated to be making between 10,000 b/d and 15,000 b/d. Pressure buildup to more than 4,000 psi prevented it from being completely shut off. During the following month, the well sanded in and shut itself off.

During the spring of 1956 the Shah of Iran indicated in a speech that exploration rights outside the consortium area might be granted. This would include all that area outside the approximate area indicated on the accompanying map, including the continental shelf. Such rights would have to be within the framework of the Nationalization Law of 1951, and could only be obtained through contract with National Iranian Oil Co. (NIOC), as that company was established by the 1951 law. A number of companies are now negotiating for exploration rights over both onshore and offshore areas, including ENI, owned by the Italian government.

Production

Production by the consortium during 1955 averaged 326,000 b/d (15,772,000 long tons). To the yearly total should be added 4,747 b/d produced at Naft-i-Shah field by NIOC during 1955. Of this amount only 3,938 b/d was net production; the remainder was recycled or used in operations.

Under the agreement, the consortium guaranteed to produce 17,500,000 cubic meters (300,000 b/d) in 1955, 27,500,000 cubic meters (470,000 b/d) in 1956, and 35,000,000 cubic meters (600,000 b/d) of crude in 1957. This is in addition to the requirements of National Iranian Oil Co. for internal consumption—such requirements now running at about 300,000 b/d.

The Iranian government recently asked for an increase in production over these limits to raise the government's income to meet an estimated budgetary deficit of $28 million to $56 million for 1956. The consortium agreed to make a special effort to increase production, within the limits of loading and other facilities.

Consortium production is derived mainly from five fields, the largest of which is Agha Jari. Other fields are Masjidi-i-Sulaiman, Haft Kel, Naft Safid, and Lali. A sixth field, Gach Saran, is very large but is not being produced as yet. Haft Kel, Lali, and Agha Jari are also young fields. There is one gas field, Pazanum. It is not being produced at present.

TABLE I

IRANIAN CRUDE PRODUCTION—1956

(Thousands of Barrels Per Day)

January	363.3	July	596.3
February	425.7	August	542.3
March	538.3	September	577.0
April	567.7	October	634.0
May	559.3	November	527.0
June	570.3	December	511.8
		Year	534.4

*Estimate.

Refining

There is one large refinery in Iran. It is located at Abadan, and has a throughput capacity of about 585,000 b/d, with complete facilities, including a 130,000 b/d cracking plant which was recommissioned during late 1955. A smaller plant at Kermanshah, with a capacity of 2,000 b/d, is operated by NIOC.

A topping unit at Masjid-i-Sulaiman field came into operation during September 1955, at about 20,000 b/d. It has a capacity of about 70,000 b/d, producing fuel oil for the internal Iranian market.

Under the agreement, the consortium undertook to strive for a refinery throughput of 7,500,000 cubic meters (about 136,233 b/d) during 1955, 12,000,000 cubic meters (about 219,467 b/d) in 1956, and 15,000,000 cubic meters (about 272,466 b/d) in 1957. April 1956 runs had already risen to 230,000 b/d; 1955 runs averaged 153,700 b/d.

Marketing

Exports from Iran during the six months' period of January through June of 1955 totaled

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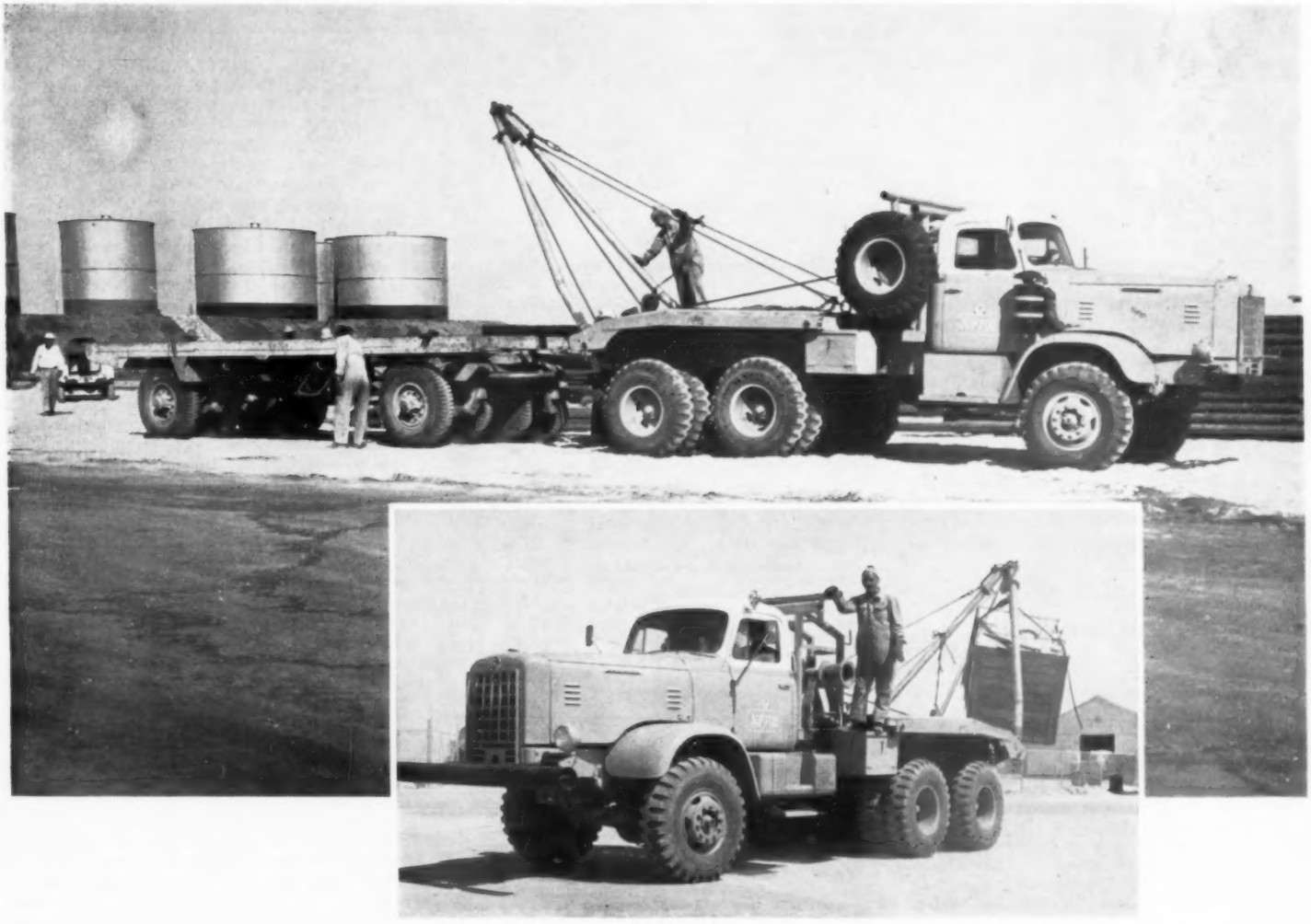

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TABLE II—IRANIAN PIPELINES

CENTRAL AREA PIPELINES

Lali to M.I.S.	Composite Line 8"—10"—12". (Capacity 30,000 b/d). 8" x 19.3 + 10" x 10.5 + 12" x 8.5 = 38.3 miles.
M.I.S. (Tembi) to Wais:	Tembi to Abgunjik 2 x 10" + 1 x 12" x 15 miles. Abgunjik to Haddam 4 x 10" x 14 miles. Haddam to Wais 3 x 10" x 17.5 miles. TOTAL DISTANCE TEMBI TO WAIS: 46.5 miles.
Naft Safid to Salamat:	1 x 12" x 9.5 miles (joins above system 7 miles from Abgunjik).
Naft Safid Bonna Abdullah:	1 x 10" x 9.5 miles Joins Haft Kel—Wais lines.
Haft Kel to Wais	Haft Kel to Bonna Abdullah 2 x 12" x 20.2 miles Bonna Abdullah to Wais: 3 x 12" x 19.0 "
Wais to Ahwaz Manifold:	2 x 12 x 14.5 miles. (Haft Kel Lines). 1 x 12 x 14.5 " } M.I.S. Lines. 2 x 10 x 14.5 " }
Ahwaz Manifold to Kut Abdullah:	2 x 12 x 8 miles. Haft Kel Lines. 1 x 12" x 8 " } M.I.S. Lines. 2 x 10" x 8 " }
Haft Kel No. 1 to Kut Abdullah:	2 x 12"x 61"
Kut Abdullah to Abadan:	Kut Abdullah to Dorquain 4 x 12 x 36 miles. 2 x 10 x 36 " Dorquain to Marid 4 x 12 x 19 " 2 x 10 x 19 " Marid to Abadan 1 x 12 x 9.5 " 1 x 16 x 9.5 " 2 x 10 x 9.5 "

Capacity to Abadan All Lines: 280,000 B/D
" " " One line isolated: 257,000 B/D

SOUTHERN AREA PIPELINES

Gach Saran to Abadan:	Gach Saran to Suweira 1 x 12 x 70.50 miles. Suweira to Mashur Manifold 2 x 12 x 35.25 " Mashur Manifold to Abadan 2 x 12 x 56.00 " Total distance G.S. to Abadan: 161.75 "

Capacity G.S. to Abadan—52,000 B/D.

Agha Jari to Mashur Manifold.	No. 1 Unit to Mile 19 3 x 12 x 19 miles. No. 2 " " " " 1 x 16 x 19.5 " Flow Tank " " " 1 x 20 x 19 " Mile 19 to Mashur Manifold 5 x 12 x 21.5 miles. 1 x 16 x 21.5 " 1 x 20/22 x 21.5 miles.
Mashur Manifold to Mashur Tank Farm:	2 x 12 x 4.2 miles. 1 x 16 x 4.2 " 1 x 20 x 4.2 "
Mashur Manifold to Abadan: **(excluding 2 x 12" Gach Saran Lines)**	1 x 12 x 56 " 2 x 16 x 56 "

about 41,580,000 bbl, or 228,462 b/d. First quarter 1956 exports totaled about 368,100 b/d. Destinations of exports were as shown in Table III.

There are no petroleum imports of importance, since refining supplies internal needs. Iranian consumption has mounted in recent years from 240,000 tons or about 4,800 b/d in 1939; 31,000 b/d in 1954. The Iranian government estimates consumption will rise to around 40,000 b/d in 1960. Consumption in May 1956 was running about 1.7 million tons yearly (about 34,000 b/d). Internal prices in May 1956 were 4.20 rials per liter for motor gasoline (about 20.5 US cents per gallon), 1.77 rials per liter for kerosine (about 8.7 US cents per gallon), 787 to 2,050 rials ($10.23 to $26.65) for diesel oils per metric ton, depending on distance from refinery.

Around one-tenth of this consumption is supplied from the Naft-i-Shah field, operated by NIOC.

Table III—

IRANIAN EXPORTS OF CRUDE

January-June 1955
(Barrels)

Australia	5,939,635	Israel	1,000,000
Belgium	1,348,720	Italy	1,630,317
Canada	112,343	Japan	1,982,822
Ceylon	335,153	Portugal	46,898
Egypt	807,744	Sweden	828,590
France	2,203,383	United Kingdom	3,135,576
Germany	532,099	Total	41,580,000
Others	18,140,217		(228,462 b/d)

Transportation

There are two main sections to the pipeline system of Iran. One serves the Lali, Masjid-i-Sulaiman, Naft Safid, and Haft Kel fields to Abadan; the other serves the Agha Jari and Gach Saran fields to Mashur and Abadan. There is also a high-pressure 3-in.-diameter line from the Naft-i-Shah field to the Kermanshah refinery. This is outside the consortium area, and is operated by NIOC. A 10-in. products line is being constructed by NIOC from Ahwax, which is a central point 75 miles north-northeast of Abadan, to Teheran, where most consumption is located. The total length is 590 miles, and yearly capacity will be 2 million tons (about 40,000 b/d). It will handle mainly gasoline, kerosine, and gas oil—following the main road and railway routes to Teheran, near the location of the recent Qum discovery.

OIL LAWS

CONSORTIUM AGREEMENT: Following the nationalization, a consortium was formed in 1954 comprising British Petroleum Co. Ltd. (then Anglo Iranian Oil Co.) and a group of other major oil companies. British Petroleum will receive compensation from the participating companies in the reported amount of $600 million in exchange for 60% of its interest in Iran. The 60% has been divided among consortium members as follows: Five major American companies, Standard Oil Co. (New Jersey), Gulf Oil Corp., The Texas Co., Standard Oil Co. of California, and Socony Mobil Oil Co.—each with 7%; 9 independent American companies with a total of 5%, as follows: American Independent Oil Co., The Atlantic Refining Co., Hancock Oil Co., Getty Oil Co. (formerly Pacific Western Oil Corp.), Richfield Oil Corp., San Jacinto Petroleum Corp., Signal Oil and Gas Co., The Standard Oil Co. (Ohio), and Tidewater Oil Co. The British Petroleum Co. Ltd. now holds 40%. One Dutch company, NV De Bataafsche Petroleum Maatschabbij, holds 14%. One French company, Compagnie Française des Pétroles, holds 6%.

On a nationality basis, this divides up 40% American, 6% French, and 45.6% British. Only 8.4% is Dutch, since the NV De Bataafsche Petroleum Maatschappij is owned 40% by British interests (Shell Transport and Trading), and 60% by Dutch interests (the Royal Dutch Petroleum Co.).

The consortium agreement was finally signed October 29, 1954. NIOC, the Iranian government's company, retained title to all the oil and installations in Iran. In a supplemental agreement it paid British Petroleum £25 million (about $70 million) as compensation for internal distribution facilities and the Naft-i-Shah oil field.

Under the agreement, the consortium companies have the exclusive right to explore, produce, and operate the Abadan refinery and to load on tankers oil from the area indicated on the accompanying map. It includes areas lying three miles offshore from the line of lowest tide up to the border of Iraq, including the islands of Kharg, Khargu, Shu Aib, Hindurabi, Qais, Qishm, Hengam, and Hormuz, and three miles offshore from lowest tide mark of same. Lands outside the indicated area may be acquired, if "reasonably" needed, through NIOC.

The consortium is granted the use of the fixed oil assets in the agreement area for 25 years, with right to three 5-year renewals, or a total of 40 years, subject to reductions in area to about half present size for the last 5 years. The companies, in turn, set up two "operating companies" in Iran, both incorporated in The Netherlands. The first of these produces the oil, and is known as the Iraanse Aardolie Exploratie En Productie Maatschappij NV (Iranian and Exploration and Producing Co.). The second refines the oil, and is known as Iraanse Aardolie Raffinage Maatschappij NV (Iranian Oil Refining Co.).

These companies are complemented in London by two British-incorporated companies. The first of these is Iranian Oil Participants Ltd., which holds the stock of the operating companies. The second London company is the Iranian Oil Services Ltd., which does purchasing and staff recruiting for the companies in Iran. The American independent interests in the London stock company (representing the nine independent companies) is known as Iricon Agency Ltd.

The operating companies receive compensa-

IRAN
IRAN CONSORTIUM AREA
Area shown is that covered and affected by the agreement of October 29, 1954 between the National Iranian Oil Company and the Consortium. It does not form part of the agreement.
IRAN
IRAQ

Table IV—Iranian Oil and Gas Fields

Field	Year of Discovery	Depth Range (Feet)	Flowing Wells	1st Quarter 1956 Production (B/D)	Gravity (API)
Aghi Jari	1936	4,900-9,800	13	323,000	35.0
Gach Saran	1928	2,800-6,150	1	132	31.0
Haft Kel	1928	1,900-4,000	6	67,000	38.0
Lali	1938	4,000-9,000	1	4,400	36.0
Masjid-i-Sulaiman	1908	640-3,600	15	34,000	38.0
Naft Safid	1935	3,000-6,000		13,000	35.0
Pazanun (gas field)	1937				
Naft-i-Shah	1923	1,980	2	(1) 3,938	35.0
Total			38	357,667	35.0

(1) Represents net production for 1955.

Table V—REFINERIES IN IRAN

Name of Operating Company	Plant Location	Crude Capacity	Type Plant	Cracking Capacity
Iranian Oil Refining Co.	Abadan (1)	500,000	Comp.	130,000 TC
NIOC	Kermanshah	2,100	S	—
Iranian Oil Exploration & Producing Co.	MIS (2)	70,000	T	—
NIOC	Naft-i-Shah	5,140	S	—
Total		627,140		130,000 TC

(1) 95,000 b/d thermal cracking capacity and 35,000 cat cracking capacity.
(2) Crude topping plant producing fuel oil for Iran's internal consumption.

tion for their production and refining operations at the rate of one shilling per cubic meter produced or refined, which amounts to about two cents per barrel from the trading companies. The trading companies contribute capital and expenses of the operating companies, and NIOC contributes also its proportional share of expenses involved in production or refining of its crude allocations.

Each trading company buys its crude oil at the wellhead from the NIOC for a "stated payment" of 12½% of its posted price at the point of export. It then may have the oil delivered by the exploration and producing company, either to the crude-oil loading port of Bandar Mashur or to the Abadan refinery. In the first case, each trading company sells the crude oil at the point of export to its individual customers (normally, but not necessarily, affiliates) who export and market the oil independently outside Iran. In the second, the refining company processes the oil for the trading company and delivers the resulting products to it for sale in the same way. NIOC is entitled to take up to 12½% of the total crude produced for export and sell it on the open market or to the trading companies at posted prices.

The profits arising within Iran from the trading companies' operations are taxed under the laws of Iran, and against the resulting tax payment is set off the amount of the stated payment already made to NIOC for the crude oil. The effect of these payments taken together is to bring about an equal sharing of these profits between Iran and each trading company.

A later supplement to the agreement provided discounts in the posted crude prices to members of the consortium as an incentive to production over the specified minimums.

These discounts were 5% on the first extra 63,000 b/d, 7½% on the second 63,000 b/d, and 10% on the third 63,000 b/d.

In the case of the refining company, the use of fixed assets can be included as an operating cost at an annual rate of 4.1 million pounds ($11.48 million) for the first 10 years and 2.6 million pounds ($7.28 million) yearly for the producing company for the same period. All new fixed assets installed become the property of NIOC, and are written off against operating costs over a 10-year or lesser period, in agreement with NIOC.

The companies must conform to good oil-industry and engineering practice in conservation, carry on exploration to maintain reserves, employ and train Iranians so far as possible, and keep full records—keeping Iran's interest in mind. Reports and information are to be held confidential by NIOC or the companies, unless mutual consent to release is obtained. NIOC is authorized to explore, produce, and refine for internal consumption only.

A "Most Favored Nation" clause is contained in the agreement, specifying that should more favorable conditions be given any other country in the Middle East, the government of Iran may demand conditions of equal favorability. The government of Iran specified, however, that conditions of the law and the income-tax rates would not be less favorable to the companies than those existing on August 1, 1954, including deductions of previous payments to the government, "reasonable" amounts of depreciation, obsolescence, exhaustion and depletion, and any expenses or losses suffered in Iran.

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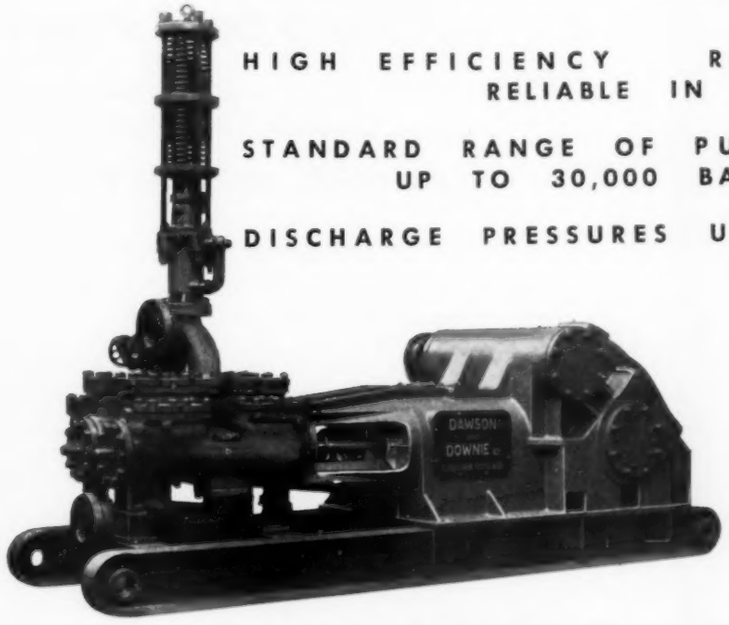

Illustration shows one of a series of pumps supplied to BRITISH PETROLEUM CO. LTD.'S refinery at ADEN, for pumping diesel and fuel oils from the refinery to the B.P. bunkering installation.

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TABLE VI—STATISTICAL SUMMARY OF IRANIAN PETROLEUM OPERATIONS
(Thousands of Barrels)

Year	Production	Exports (Crude)	Imports (Products)	Exports (Products)	Refining Runs	Consumption
1953	10,000e	—	NA	—	10,000e	NA
1954	22,400	3,600	190e	15,000e	18,500	10,658e
1955	120,723	4,170+	205e	37,400+	50,932	11,315
1956	572,000 b/d (Apr.)	—	—	—	230,000 b/d (Apr.)	—

e-Estimated. +—Represents first six months figures. NA—Not available.

TABLE VII—CRUDE EXPORT PRICES
(Dollars Per Barrel, April 6, 1956)

Type	Gravity (API)	British Petroleum	Shell	Mobil	Esso
Light, ex B. Manshur	34-34.9	1.91	1.91	1.91	1.91
Light, ex Abadan	34-39.9	1.86	1.86	1.86	1.86
Heavy-medium, ex Abadan	31-31.9	1.67	1.67	1.67	1.67

Prices f.o.b. excluding local port or government charges. Esso price for heavy crude effective, Jan. 10, 1956. Texas Co. price is the same.

All imports of equipment and supplies into Iran by the companies are free of import duty, not including imports for the use of company personnel.

Any of the consortium members has the right to transfer or, after five years, sell its interest in the consortium agreement.

Any disputes arising between the consortium and the government of Iran are to be settled by arbitration—with three arbiters to be appointed, one each by the consortium and the government, and the other selected by mutual consent. If this fails, other provisions are called for, including appeal to the International Court of Justice.

NATIONAL FACTORS

Following the overthrow of Dr. Mossadegh in 1953 and the negotiations of the agreement in 1954, the political situation has remained quiet. General Zahedi, who restored the young shah to power, resigned in 1955 and was succeeded by Hossein Ala, an elderly and respected statesman.

An elaborate Seven-Year Plan was set up in 1949 for overall development of industry and agriculture in Iran, but was never implemented. Now a new plan is being financed by 60% of all oil income, amounting to about $875 million during the 7-year period. An American concern, Development and Resources Corp., has been assigned the job of making a survey of the Khuzistan province of Iran, in which Abadan and the southern oil fields are situated.

The use of oil revenues in the plan may soon provide some tangible evidence of the results of oil development. Oil payments during the fiscal year ended March 31, 1956, together with the value of the oil in kind taken by NIOC, are estimated at $97,000,000. In addition to these payments, the oil companies bring in large sums for wages, etc. These are about $50,400,000 during the year, which makes a total of about $147,400,000. The amount in rials (the Iranian unit of currency) is about 11 billion (one rial is valued at 76.50 to the dollar, or 1.3 US cents per rial).

Oil payments from October 29, 1954 through March 31, 1956 were $130,214,632.80, of which income tax represented $93,012,752. The total payments were divided into $9,900,086 from October 29 through December 31, 1954; $87,997,887.60 during year 1955; and $32,316,659.20 in the first quarter of 1956. Payments during 1956 are estimated at $145 million.

Other income for Iran, which will add to her budgetary receipts necessary to meet a planned outlay of more than 14 billion rials during 1956, is forthcoming from the United States which, on April 4, 1955, made a $32 million loan to Iran as part of a $74.3 million allotment for technical development and cooperation.

The government of Iran has also tried to encourage industry by the passage of a new law during early 1955 which permits profits transfers without currency restrictions commonly associated with the sterling area, of which Iran is a part. The law also provides for "fair and adequate" compensation in the event of expropriation or nationalization, plus repatriation of the bulk of the investment.

During the present negotiations concerning exploration rights offshore and onshore outside the consortium area, the government has taken the position that Iranian reserves approximate 500 billion barrels. This belief was, of course, reinforced by the Qum discovery, and has made negotiations difficult. No agreements are known to have been reached during 1956 on such exploration, which would have to be by contract with NIOC, since the entire country outside the consortium area is reserved to the government.

END

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IRAQ

Except for a small area bordering Iran, held by Khanaqin Oil Co. Ltd., all of Iraq is under concession to Iraq Petroleum Co. and subsidiaries, Basrah Petroleum Co. Ltd., and Mosul Petroleum Co. Ltd. Iraq Petroleum Co. is now owned 23.75% each by the British government's British Petroleum Co. (formerly Anglo-Iranian Oil Co.), Compagnie Française des Pétroles (whose stock is owned 35% by the French government), Anglo Saxon Petroleum Co. (Shell), and Near East Development Co. (owned 50-50 by Standard of New Jersey and Socony Mobil). Remaining 5% is owned by Participations and Explorations Corp. (controlled by the estate of the late Mr. Gulbenkian).

Exploration

Exploratory work, begun in the early 1920's, culminated in 1927 in the largest discovery in Iraq to date, the Kirkuk field in northeastern Iraq—one of the world's largest oil fields. The two Iraq subsidiaries also continued exploration, and in 1927 the Mosul Petroleum Co. (MPC) discovered oil near the Qaiyarah area, although too heavy and sulfurous for commercial exploitation. In 1939 oil similar to Kirkuk's was found by MPC at Ain Zalah—other discoveries at Butmah and Mushorah, in the Qaiyarah area at Jawan, Najmah, and Qasab. The Basrah Petroleum Co. discovered the Zubair field in the southeast corner of Iraq, about 1948, and in 1953 the Rumaila field about 20 miles away. Another important discovery by IPC in 1953 was at Bai Hassan, near the central part of the Kirkuk field.

A principal recent exploratory development was a 11,000 b/d discovery in 1954 at Jambur, about 35 miles southeast of Kirkuk, producing 40 API crude from about 5,800 ft, in limestone of the same age as Kirkuk and Bai Hassan fields.

During April 1956 a discovery was reported about 25 miles southwest of Ain Zalah, Mosul Petroleum Co.'s best field. Named Sasan No. 1, the well encountered oil shows of "excellent gravity" between 5,300 ft and 5,500 ft. Mosul Petroleum has only 2 fields, producing about 26,000 b/d, and has had little success in previous exploration. However, the new discovery did not prove commercial.

Production

Commercial production, begun in 1927, totaled 338,000 bbl during that year. Lack of transportation facilities (Kirkuk is more than 500 miles from the Mediterranean and even farther from the Persian Gulf) prevented production until pipelines had been completed. Production then began to rise, by 1955 reaching 690,600 b/d—thus making Iraq the third largest Middle East oil producer.

Production in 1956, which was rapidly heading for a year's record, was reduced to an estimated 646,800 b/d by the Suez crisis. The pipelines from Iraq to Syria and Lebanon were disabled by action within Syria, reportedly by Syrian soldiers. Liftings from Fao terminal were slowed by the general tanker shortage.

The major field is the Kirkuk anticline, more than 60 miles long. It produced 503,004 b/d in 1955 from about 2,750 ft, with a total of 44 producing wells as of December 31.

Crude produced is mainly from the middle Eocene. It has an average API gravity of 35.2. The field has observation wells as follows: 3 gas-oil, 15 oil-water, and 1 water; one well is temporarily plugged.

Second largest producer is the Zubair field of Basrah Petroleum Co.—producing from 11,000 ft (some of the deepest production in the Middle East). The third field is Ain Zalah, producing from about 5,500 ft. Both Ain Zalah and Zubair produce from the Cretaceous.

Naft Khaneh, the Khanaqin Co.'s field (production of which is sold under long-term contract to the Iraq government) produced 9,300 b/d in 1955 from around 3,000 ft, with 2 flowing wells from the Oligocene and Miocene. Exploration drilling in the Naft Khaneh field is testing oil possibilities below the productive Kalhur limestone, the equivalent of the upper Asmari limestone.

CRUDE PRODUCTION IN IRAQ—1956
(Thousands of Barrels Per Day)

January	522.4	July	766.1
February	659.8	August	754.2
March	742.0	September	758.1
April	769.3	October	755.6
May	843.2	November	183.4
June	715.8	December	215.0
		Total	639.2*

*Estimated.

The last producing field (discovered in 1954) is Rumaila, which during a short period in 1954 made 1,424 b/d from the lower Cretaecous below 10,000 ft. As of January 1, 1956, 13 wells had been completed—with 3 producing. Pay formation is similar to Zubair's.

Production is scheduled to rise under new agreements, but (given political stability) transportation problems must be resolved to permit the hoped-for increase to 1,000,000 b/d within 5 years.

Transportation

Transportation difficulties long have held back Iraqi production. The first pipelines laid were to Haifa (Israel) and Tripoli (Lebanon)—each with at least 45,000 b/d capacity. The Haifa line was shut down in 1948, and has remained closed because of Arab-Israel hostilities; a parallel line was abandoned in 1948 for the same reason.

However, the increased postwar demand led to a new 16-in. line to Tripoli (completed in 1949), and Kirkuk's production rose to 165,000 b/d by 1951. In April 1952 a 30- to 32-in. line of about 300,000 b/d capacity was completed from Kirkuk to Banias in Syria (cost, 120 million dollars)—raising pipeline capacity to more than 460,000 b/d.

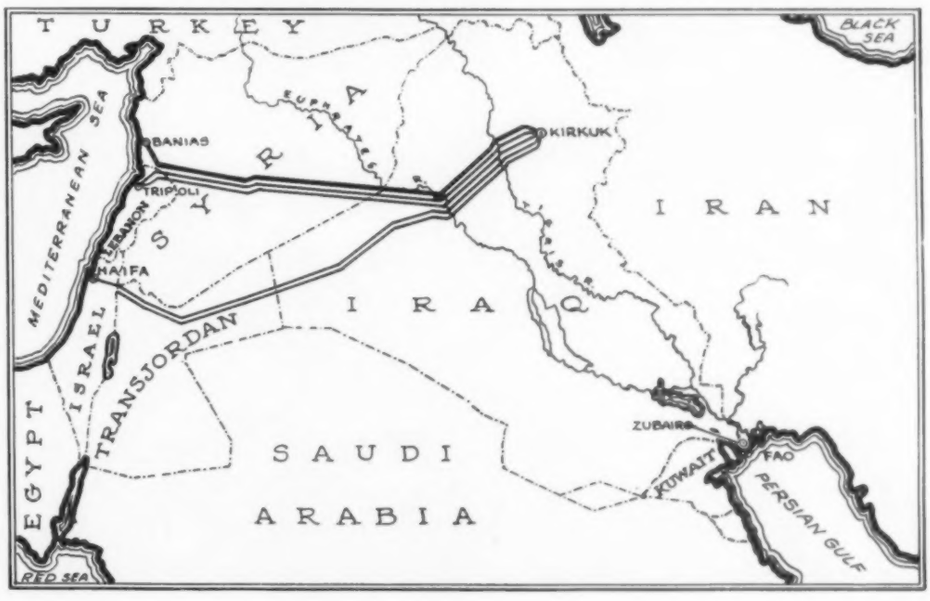
A 12-in. line has been laid from the Ain Zalah and Butmah fields in the north to the Kirkuk system, and a 12-in. line extended to the Baghdad refinery. In the south, the Zubair field was connected in 1951 to a 75-mile 12-in. pipeline running to Fao, and in 1954 a 24-in. parallel line was laid with about 125,000 b/d capacity. The Rumaila field was connected by a 12-in. line to Zubair. The Naft Khaneh field is connected with Kermanshah in Iran by a 3-in. line, and a 4- to 8-in. line to Alwand within Iraq—both lines for refining of local consumption. These developments recently have permitted a great increase in production.

On May 10, 1955 the Iraq Petroleum Co. announced the planned construction of a new 24-in. pipeline to Banias from a point east of Homs in Syria. Expected capacity is 9 million tons annually, or about 187,151 b/d. This line was originally scheduled for Tripoli (Lebanon), but the company was unable to reach an agreement with the government.

Recently announced diversion of the Haifa lines to Sidon should add six million tons, or 124,767 b/d capacity. A proposed government project is for construction of a pipeline from Zubair to deep-water facilities in Kuwait, because the Fao terminal through which Zubair production at present moves would necessitate very long facilities to load the larger new tankers now being constructed.

The negotiations with Kuwait appear to be nearing completion, since during late 1956 it was announced that agreement on the construction of a water pipeline from Iraq to Kuwait had been reached, and agreement on the oil pipeline is expected to follow shortly.

During late 1956, and following the controversy with Syria and Lebanon over pipeline transit dues, IPC announced that it was carrying out preliminary reconnaissance for a possible pipeline route through Turkey.



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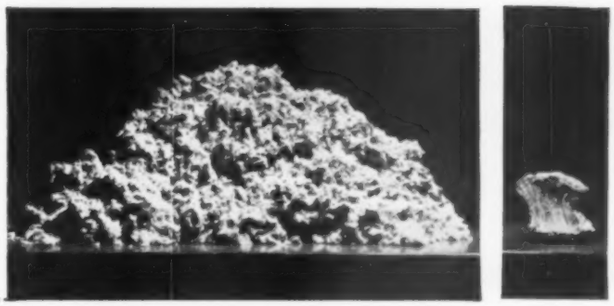

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THERMAL CONDUCTIVITY K = B.Th.U. in./sq. ft. hr./in./°F.			0.43			0.47			0.53		
MEAN TEMPERATURE °F.			250			350			450		
Nominal Pipe Size	O.D. Pipe	Thickness of Insulation	Heat Loss B.Th.U. sq. ft. hr.	Effic. %	Surface Temp. °F.	Heat Loss B.Th.U. sq. ft. hr.	Effic. %	Surface Temp. °F.	Heat Loss B.Th.U. sq. ft. hr.	Effic. %	Surface Temp. °F.
6"	6¼"	1"	135	87·7	126	233	90·6	167	354	92·5	218
		1½"	102	90·8	107	177	92·9	135	270	94·3	171
		2"	83·6	92·4	97	145	94·1	118	223	95·3	145
		2½"	71·8	93·5	91	125	95·0	107	192	96·0	128
		3"	63·5	94·2	86	110	95·5	100	170	96·4	117
		3½"	57·3	94·8	83	100	96·0	95	154	96·7	109
		4"	52·6	95·2	81	91·7	96·3	91	142	97·0	103
8"	8½"	1"	130	88·0	127	225	90·8	169	341	92·7	222
		1½"	97·7	91·0	108	169	93·1	137	258	94·5	174
		2"	79·2	92·7	98	138	94·4	120	211	95·5	148
		2½"	67·4	93·8	92	117	95·2	109	180	96·1	131
		3"	59·2	94·6	87	103	95·8	102	159	96·6	120
		3½"	53·2	95·1	84	92·7	96·2	96	143	96·9	111
		4"	48·5	95·6	82	84·6	96·5	92	131	97·2	105

These figures are compiled from results of official tests by THE NATIONAL PHYSICAL LABORATORY, TEDDINGTON, computed in accordance with formulae shown in BRITISH STANDARD SPECIFICATION appendices.

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Refining

As of mid-1956, the total 53,130 bbl per stream-day refining capacity in Iraq was contained in 5 refineries. The largest (and only one with cracking facilities) is the government's Oil Refineries Administration plant at Daura, near Baghdad, with about 24,000 bbl per stream-day crude distillation capacity and 18,000 b/d thermal cracking facilities.

Next is Khanaqin Oil Co. Ltd.'s refinery at Khanaqin, with about 11,400 bbl per stream-day capacity—followed by IPC's K.3 refinery at Haditha along the piplines to Tripoli, with 13,000 bbl per stream-day and, finally, Khanaqin's 3,430 b/d skimming plant at Muftieh Depot, in Basrah.

Since Iraq's demand for products is not great, these plants do not refine a wide range of products—much of their production being used for the companies' own operations.

An asphalt refinery under construction near Qaiyarah will produce about 60,000 metric tons yearly of asphalt, plus some gasoline and light and heavy fuel oils. A small plant planned for Kirkuk should produce chemicals from natural gas, and a 25,000 metric-ton-per-year lube plant is planned for Daura.

Marketing

Consumption within Iraq has increased rapidly in the post-World War II period, rising from around 6,049 b/d in 1945 to 22,088 b/d in 1955. Consumption in 1956 is estimated at 23,920 b/d. The estimated increase over the next 4 years will put consumption at around 29,440 b/d in 1960.

Imports into the country have decreased steadily, as domestic refining capacity has risen. They are presently at minimum levels, consisting only of specialty products which are not produced locally.

It is as an exporting nation that Iraq has achieved first-rank importance. More than 90% of her production goes abroad. Net exports during May 1956, the latest available figure, were up to 2,697,183 long tons, equivalent to about 635,000 b/d. Source of these exports was mainly the Kirkuk field, followed by Zubair and Rumaila.

The largest proportion of Iraq's crude exports have gone to Europe, especially to France where the Cie. Française des Pétroles imports to its affiliated companies and to French refineries. During November 1956 the government prohibited shipments on any tanker bound for France or England, which formerly had taken about 38% and 17%, respectively, of Iraq's exports. The result was a drastic reduction of exports and of production.

OIL LAWS

There are four concessions in Iraq at present. The Iraq Petroleum Co. concession was granted in 1925. The Mosul Petroleum Co. took over the 1932 concession of a company known as the British Oil Development Co., which covers about 45,000 square miles. The Basrah Petroleum Co. took the southern areas of Iraq. A fourth concession was obtained in 1901 by Anglo-Iranian Oil Co. on territories which were then part of Iran. When these areas later became part of Iraq, the Iraq government granted a concession in 1926 over the same area, based on the 1901 agreement. These concessions comprise the oil regulation of the country.

The legal provisions of all four of these concessions are similar. Their terms are for 75 years from the date of granting. Each company may abandon its concession at any time, although if this takes place during the first 30 concession years the company may recover everything but permanent buildings, on which the government has a right of purchase. If abandoned after 30 years, installations and other plants revert to the government without compensation.

Each concession is exclusive, i.e., it conveys the exclusive right to explore, develop, refine, transport, and export petroleum within its area.

Pipelines and other transportation facilities may be built without charge by the concessionaire.

In the event of disagreement, there is a provision for an arbitration board. The concessions are subject to *force majeure*.

Other provisions include the obligation to use local labor from Iraq whenever possible, as well as to train such labor for skilled and semi-skilled jobs.

In all cases the companies are required to be British, with a British chairman of the board. Each company's board of directors was to have at least one Iraqi, appointed by the government. In 1951 this was raised to two Iraqis, with all rights possessed by the other board members. The companies were given the right freely to create subsidiary companies in Iraq, with their same rights and obligations, although on formation of each any offering of stock to the general public must give preference to Iraqis to the extent of at least 20%.

In 1952 the concession payments were revised to provide for the now-conventional 50-50 payments arrangement for IPC and its two affiliates, retroactive to January 1, 1951.

Under present arrangements the government receives one-half of profits from crude production before foreign taxes, with all previous royalty payments suspended. A lump settlement of 5,000,000 pounds sterling was made on behalf of all 3 companies, covering past government claims.

As of January 1, 1954, the amount of income to the government is hitched to a minimum production level of 22 million tons for IPC and MPC, and 8 million tons as of January 1, 1956 for BPC, unless the companies are prevented from producing or selling the crude for reasons beyond their control, not including commercial considerations. In any case, the government's share was to be not less than 20 million pounds sterling per year in 1953 and 1954, and 25 million pounds sterling annually from 1955 on, while the companies were operating. Nor was the government's income to be less than the value at posted prices of 25% of IPC and MPC's net production, plus 33 1/3% of BPC's, except in the case of *force majeure*.

Should the companies be forced to cease operations entirely due to *force majeure*, a minimum annual payment of 5 million pounds sterling is payable, up to 10 million pounds at any one time, returnable out of future payments exceeding 25 million pounds sterling. Any time the government feels better terms are being received by any neighboring country, it is free to ask for same within its own borders.

A major consideration is the determination of profits. Since IPC and affiliates were set up to operate on a nonprofit basis, i.e., each company taking its share after company expenses, profits had to be defined. For tax purposes, they were defined as the difference between the "actual" cost of the oil and its "border value." The actual cost of the oil is defined as its cost of production including company expenses (but not company oil use or foreign taxes) and overhead, depreciation of physical assets in Iraq at 10% yearly, and amortization of capital expenditure in Iraq at 5% yearly. The "border value" is determined by the average realization from long-term and bulk sales (now set at 2% discount for same), the company's geographical position, and applicable posted f.o.b. prices.

Actual costs were determined as 23 shillings per ton in 1951, 17.6 shillings per ton in 1952, and 13 shillings per ton in 1953, or 43 US cents, 33 US cents, and 24 US cents per barrel, respectively. The latter figure is, therefore, fixed until 10% fluctuation occurs. Border value was determined for 36 API crude of Kirkuk quality at 94 shillings per ton at the Iraqi-Syrian border (about US $1.73 per barrel) and 81¾ shillings per ton (about US $1.55 per barrel) at Fao.

In March 1955 these were revised to 108 shillings 3 pence per ton or (about US $2.00 per barrel) and 111 shillings 11 pence per ton or (about US $2.07 per barrel), respectively. A discount of 2% for bulk sales was given, down from a former level of 17 shillings 6 pence a ton on Mediterranean sales and 13 shillings a ton on Basrah production. Provision is made to adjust these values appropriately for crude of different quality and gravity. The actual differences on which taxes are payable are, therefore, 95 shillings 3 pence per ton or (about US $1.76 per barrel) at Syrian-Iraqi border, and 98 shillings 11 pence per ton or (about US $1.83 per barrel).

For 1951, when other values were used, profits were calculated on the basis of US $1.33 per barrel, rising to US $1.43 in 1952. For 1953 and 1954, they would have been US $1.29 per barrel; however, the March 1955 price was made retroactive, with payments in compensation for same being made by the companies of 10.7 million pounds due for 1954 and an undetermined amount due for 1953. All amounts are payable in pounds sterling, to be deposited in a London or Baghdad bank and payable quarterly if in arrears.

Other provisions call for delivery of 12.5% of annual production f.o.b. marine terminal, if the government so indicates, 6 months in advance. This may be freely sold by the government on the open market. If the oil is not taken, the government is entitled to receive payment equal to that quantity at posted prices. The value thereof is deductible from the companies' income-tax liability, so it is not an additional levy. Amounts taken in kind are also deductible from the government's minimum percentage of production as outlined earlier.

Other provisions of the concessions include a payment in return for the exemption from all other taxes, amounting to 20,000 pounds per year, but deducted before calculation of the 50% income tax. An excise tax levied on the companies' refinery production continues to apply, and preferential prices for the government's refinery supply at Baghdad of 5.5 shillings per ton or 10 cents per barrel.

NATIONAL FACTORS

Oil revenues constitute the large majority of government revenue at present, and are the key to the country's eventual economic development. For the first half of 1956, oil revenues amounted to 38 million Iraqi pounds, about $106,400,000. This is 7% over the corresponding period in 1955. Until the nationalization at Suez occurred, oil revenues for 1956 had been estimated at 80 million Iraqi pounds, about $215,600,000, or 15 million pounds more than was estimated when the oil agreement between IPC and the government came into effect in 1951. END

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ISRAEL

Exploration

Prior to 1952 only a limited amount of exploration had been done in Israel. Most important of the explorers was Petroleum Development Co. Ltd., a subsidiary of the Iraq Petroleum Co., which drilled in 1947 the only deep test well at that time. This was the Huleiquat (now called Heletz) well on the southern coastal plains east of Gaza, abandoned at 3,464 ft because of Arab-Jewish hostilities.

Since passage of the new petroleum law in 1952, a number of independent operators have entered and conducted an active drilling and exploration program. At the present time numerous independent companies are engaged in oil exploration, as shown on the accompanying map.

Outstanding results so far have been by Lapidoth-Israel Petroleum Co. Ltd., which late in September 1955 struck 30.5 API gravity oil at 4,906 ft while deepening the old IPC Huleiquat well at Heletz.

On deepening the well, a second strike was made at 4,946 ft where about 16 ft of oil-bearing stratum, containing slightly better-quality oil than the first 6-ft stratum, was encountered. Several offset wells were drilled along the producing anticline, which is about 50 miles long and 6 to 7 miles wide. Heletz No. 2, about ¼ mile northwest, and Heletz No. 3, ¼ mile southwest of the discovery, both came in. No. 3 found the first producing sand slightly higher; No. 2, slightly lower.

The original discovery well has produced since about October 1955, averaging around 300 b/d in recent months. Further development drilling proved the field several times larger than originally thought. Proved reserves now are estimated by the operating company at between 50 million and 60 million barrels. Output at the end of 1956 was averaging around 700 b/d from 5 flowing wells, with 4 more shut in. A total of about 33 wells will be completed by the end of 1957, and 66 by the end of 1958. Wells are on an 80-acre spacing.

Pending completion of the pipeline described later, the oil is being taken by truck to the Haifa refinery.

Lapidoth is owned by Mekoroth Water Works Ltd. of Tel Aviv, which has the majority holding in the company, and by the American-Palestine Trade Corp. ("AMPAL"), headed by Abraham Dickenstein of New York, which holds Lapidoth's stock through the American-Israel Petroleum Corp. of New York. An interest is also held by an independent US refiner, Sonneborns. One of the oldest Israeli oil firms, Lapidoth was founded in 1952.

The government of Israel recently signed a contract to purchase the output of Lapidoth's wells, which will become increasingly important in view of the Soviet government's refusal to load an Israeli tanker at Odessa—which may mean that the Russian supply contract for about one-fourth of Israel's needs will not be fulfilled.

According to the producing companies' figures, Heletz Nos. 1, 2, 3, 5, 11, and 12 were producing a total of 1,875 b/d at the end of 1956. Heletz No. 4, 6, 7, 8, and 9 were potential producers, awaiting tubing and other necessary equipment. Four wells, Heletz No. 10, 13, 14, and 15 were drilling at the year's end, and five other sites on the structure had been selected, according to the company.

IOP and Lapidoth have six rigs, of which five are working at Heletz and nearby Brur. A 7-11 rig was drilling a deep explortory well at Sodom, in the Dead Sea area, and at the year's end was down to 6,000 ft and still in salt. The company plans to rent three more rigs from companies abandoning exploration in Israel.

Production from the wells is to be connected by a gravity pipeline network which will collect from gathering tanks situated to pick up Heletz No. 1, 2, 3, and 5 in the first battery, and No. 6 when it is placed on production. The second battery will take up the flow from No. 11 and 12, and will ultimately pick up No. 7, 8, and 9. No. 4, when it goes on production, will flow directly to the main storage tanks.

Transportation

There is only one large crude pipeline, the Iraq-Haifa line, of approximately 85,000 b/d capacity, designed to serve the Haifa refinery with Iraq crude. Since 1948 it has not been permitted to operate because of the hostilities between Arabs and Jews. The Haifa refinery has been operating at minimum levels on crude brought by tankers from Venezuela and Russia.

Under present development plans a 6-in. products line is planned from Haifa to Tel Aviv at an estimated construction cost of 700,000 to 800,000 dollars.

A 4-in. crude pipeline, with reported capacity of 6,500 b/d, is being constructed between the Heletz discovery and the railway near Midgal Ashkelon, where oil will be loaded for the Haifa refinery. If the discovery proves sufficiently important, the line will be extended to the coast.

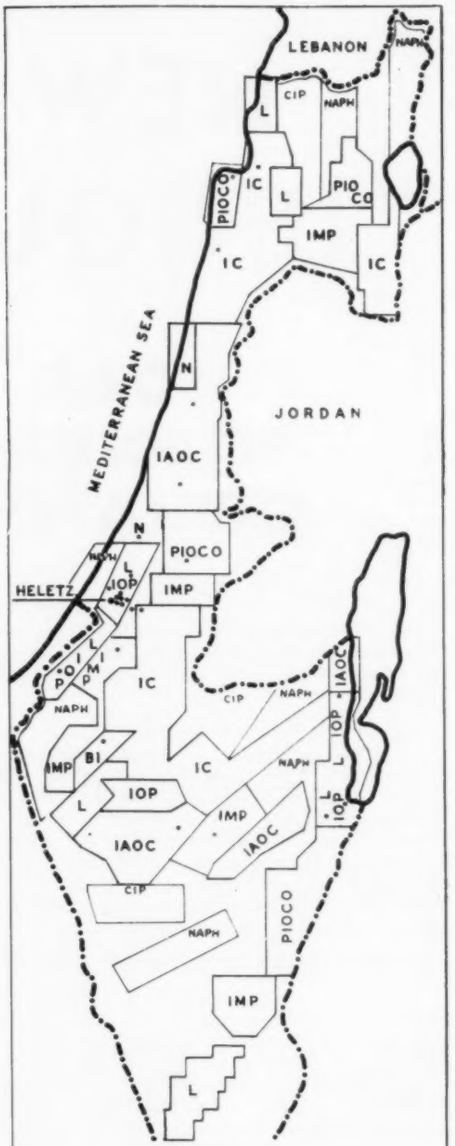
Refining

The one refinery in Israel, at Haifa, belongs to Consolidated Refineries Ltd., owned 50-50 by British Petroleum and the Shell group. Its capacity is approximately 80,000 b/d of crude charge, with 36,400 b/d of cracking. Since outbreak of war the refinery has been operating at minimum levels on crude supplied from sources such as Venezuela and Russia.

Marketing

Domestic consumption of petroleum is 4 bbl per capita yearly, about fourth highest in the Middle East. Recent increases in consumption have been mainly in fuel oil resulting from increased electric-power production, although total consumption increased by 11% during 1955 over 1954 levels.

Almost all consumption (except the production from Heletz) is supplied by imports. Imports are mostly crude, brought from Western Hemisphere sources, although a recent contract (now probably cancelled) with the Soviet Union calls for importation of 350,000 to 400,000 tons (about 7,000 to 8,000 b/d) of crude and fuel oil during 1956 in exchange for citrus fruits.



OIL LAWS

Petroleum exploration and exploitation in Israel are governed by Law No. 5712-1952,

passed in 1952. All mineral rights are owned by the State of Israel. There are no known privately-owned rights to the subsoil. Exploration and exploitation are divided into three stages: preliminary permits, licenses, and leases.

PRELIMINARY PERMITS: The permits cover all preliminary investigation, but not drilling.

LICENSE: The license covers the exclusive right to do exploration work, including drilling, on the license and related outside area, subject to approval of the commissioner.

Original term of the license is three years, with possible extension of four more at the commissioner's discretion, provided no exploitable well has been discovered.

The licensee pays an annual fee of 5 Israel pounds per 1,000 dunams (equivalent of 2 cents per acre).

Maximum area of any single license granted shall not exceed about 98,840 acres. No more than three licenses in any one district may be held by the same person.

Drilling must begin within two years, and continue with interruptions no longer than four months. Until discovery is made, all licenses in the same district are considered as one until the oldest license is five years old.

The licensee has a guaranteed right to an exploitation lease covering discoveries made. He may produce on a discovery before a lease is granted.

LEASE: A lease for development is given by competitive bidding on lands not subject to any petroleum right; otherwise it is received by the company holding an exploration license over the same area. Duration of the lease is 30 years, renewable for 20 additional. Production from the lease must begin within 3 years; otherwise it expires on 60 days' notice. Production may not be interrupted for more than 2 years while development drilling continues.

Maximum area of one lease is 250,000 dunams (62,500 acres). No more than 750,000 dunams (187,500 acres) may be held by one person or company in a single district.

Maximum royalty on production is 12½% of production, in money or in kind, deducting field use. A minimum royalty is specified per 1,000 dunams (250 acres) of lease area as follows: first year of lease, 2 bbl of petroleum; second year, 3 bbl; third year, 6 bbl; fourth year, 10 bbl; fifth and succeeding years, 16 bbl. In any year royalties do not meet this minimum, producer must pay the difference, value of petroleum determined by its Mediterranean east-coast value.

Petroleum operators are subject to general taxes of the country, including income tax; in the latter is a depletion allowance exempting from tax 27½% of gross income, up to 50% of net. Provision is also made for deduction of exploration and drilling costs.

Leases may be unitized, subject to single royalty and to drilling and production obligation at commissioner's discretion.

The lease conveys the exclusive right to explore, produce, refine, export, import, process, and trade in petroleum and products, as well as to build pipelines and other facilities for transportation of petroleum.

The lease or license may be surrendered on one month's notice without penalty.

A permittee, licensee, or lessee may import "machinery, installations, fuel, houses, transport facilities, and other such things (except consumer goods) required in operations, free of customs and other duties."

NATIONAL FACTORS

The principal factor affecting investment is political. With the resumption of hostilities with Egypt during November 1956, the Arab-Jewish war seems likely to flare into a full-scale conflict. Any investment in the area by a company holding petroleum rights in an Arab state would probably endanger the company's Arab holdings, and this factor has prevented the principal Middle Eastern oil companies from investing. The situation regarding companies without such Arab holdings is also threatened by the conflict, to the extent that properties and fields are subject to war damage, and exploration operations must be conducted in an extremely dangerous area. However, considerable exploration has been conducted despite this hazard.

Since the army in Israel is firmly subordinated to civil authorities, military revolutions of the type found in some other states are unlikely. The principal internal factor affecting investment stability is economic.

Although economic growth has been striking in recent years, Israel is still far from self-supporting, and remains highly dependent on foreign and internal income from various sources to bridge the gap between imports and exports. The government has had recourse to many measures, some of them unconventional, to meet the lack of capital not only for the foreign-trade deficit, but for interior economic development as well.

The national attitude toward foreign private capital is summed up in Premier David Ben-Gurion's early promise of complete State socialism "in my lifetime." The policy of the government has changed since, because of the shifting of government coalition strength to the right and toward free enterprise, and because of reliance on foreign private capital. There are consequently no restrictions on foreign participation in corporations in Israel.

The "Law for the Encouragement of Capital Investments" gives 2 types of inducements to foreign investors: (1) an exchange benefits provision which guarantees annual profit, interest, or amortization remittances in the original currency invested, up to 10% of the investment; (2) tax and customs benefits under which foreign companies' income taxes may be refunded in cases where the taxes paid exceed tax deductions allowable in the home country. In other words, Israel's taxes, roughly, will not exceed US taxes.

Companies in general (and cooperatives who deal with nonmembers) pay a flat company profits tax of 25%, plus a 25% net earnings tax on the remainder after deducting the company profits tax. Corporations thus pay a 50% federal tax and the 7½% local tax, with a 25% allowance off dividends distributed.

LABOR: The majority of employment terms are governed by contract, either individual or collective, between employers as represented by the Labor Department of the Manufacturers Assn. and the Jewish Labor Federation, called the Histadrut. Generally, there has been little labor trouble; and labor legislation, although highly developed, is not onerous.

Of the six major labor organizations in Israel, Histadrut (with total membership at the end of 1952 of 435,000—86% of the labor force) is dominant; it comprises various trade-union groups. Since its foundation in 1920 Histadrut has branched out into many fields outside of labor; it now controls about 15% of light-industry output; 65% of heavy industry; 70% of agricultural output; and gives medical service to 60% of the population. It also participates in oil exploration.

EXCHANGE RATE: The unit of currency is the Israel pound, divisible into 1,000 prutah. For investment purposes, value of the pound equals US 50 cents.

On February 13, 1952 it was announced that foreign investors would be allowed to import all their capital in the form of machinery, equipment, and raw materials; previously this had been only one-half.

There is no remittance tax on exchange transactions. Normally the amount of dollar exchange permitted to be withdrawn from profits is 10% annually. Profits accruing from exports in foreign currencies, as in the case of petroleum exports, may be converted by investors without regard to the 10% limitation on withdrawals.

END

Table I—ISRAEL PETROLEUM STATISTICS
(Thousands of Barrels)

Year	Production	Imports		Refining Runs	Consumption
		Crude	Products		
1929	—	—	399	—	399
1934	—	—	829	—	829
1938	—	—	1,225	—	1,225
1944	—	25,165	—	24,903	12,903
1945	—	30,081	38	30,411	15,232
1946	—	30,158	60	30,382	13,473
1947	—	22,228	43	22,228	5,663
1948	—	7,168	400	7,168	3,568
1949	—	590	800	590	1,390
1950	—	1,670	650	1,532	2,182
1951	—	5,631	NA	5,086	6,370
1952	—	6,600	NA	5,751	6,550
1953	—	6,375	NA	6,255	7,401
1954	—	7,172	NA	6,705	7,836
1955	18.3	NA	NA	7,555[e]	NA
1956	300 b/d	NA	NA	NA	NA

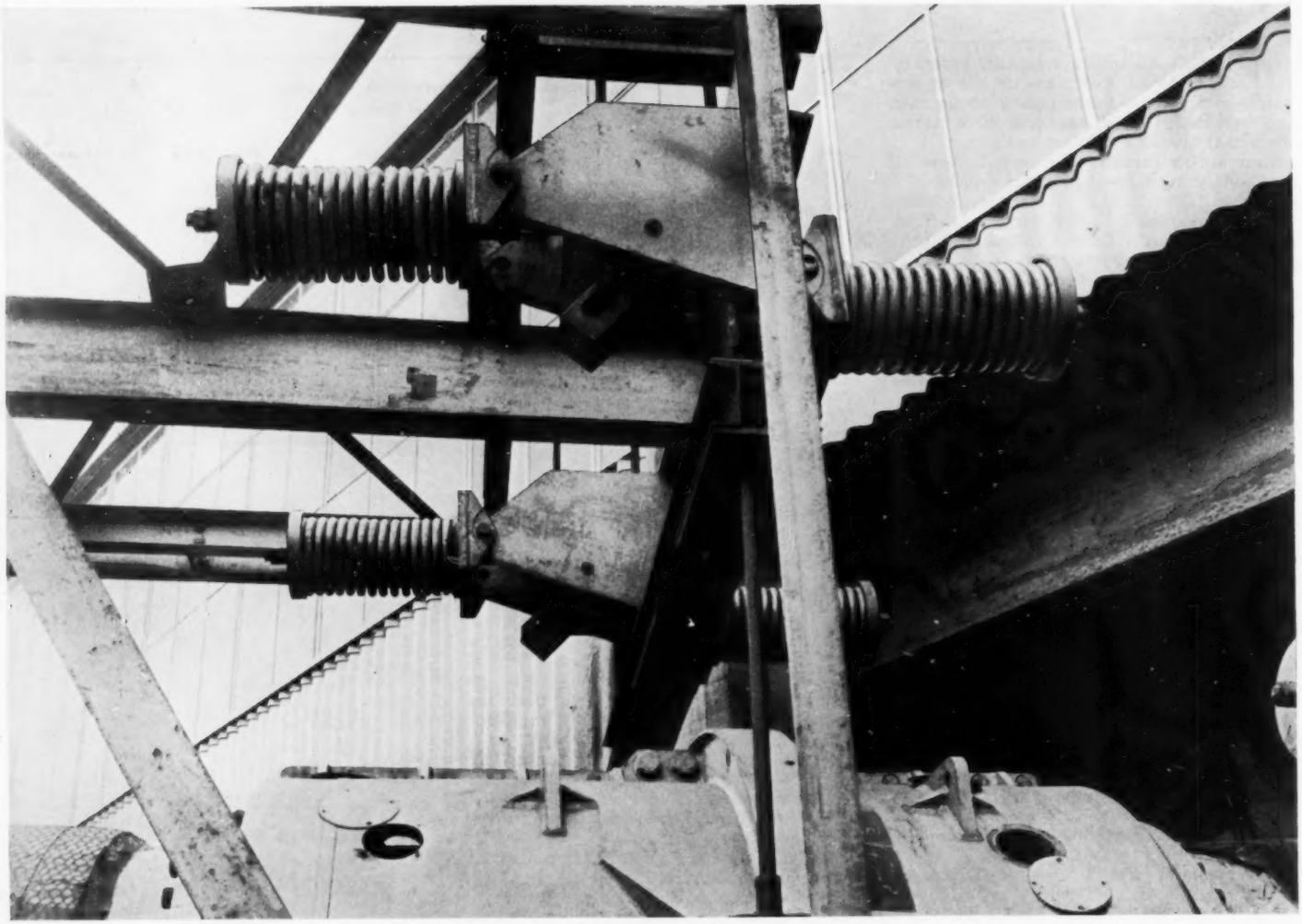
[e]Estimate.

Table II—ISRAEL REFINERY RUNS TO STILLS
(Metric Tons)

	1955	1956 Jan.-Mar.
Gasoline	191,709	55,249
Kerosine	149,787	34,761
Gas oil	223,624	54,904
Fuel oil	409,538	108,611
Butane	17,544	10,620
Asphalt	20,986	3,089
Losses	12,889	5,329
Total	1,026,077	272,563
(Total—b/d	20,521	22,713)

Table III—ISRAEL PRODUCT CONSUMPTION—1955
(Metric Tons)

Gasoline	188,444
Kerosine	136,399
Gas oil	177,042
Butane	8,195
Asphalt	20,419
Fuel oil	692,406
Miscellaneous	18,275
Total	1,248,180
(Total—b/d	24,964)



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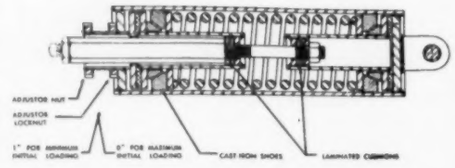

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ITALY

The petroleum industry of Italy is overshadowed by the contest of governmental vs. private development. The only producing field in peninsular Italy is subject to governmental monopoly through Ente Nazionale Idrocarburi (referred to hereinafter as ENI).

Exploration

The outstanding recent development in exploration consists of five discoveries along the Adriatic coast. The first strike was by Petrosud Co., an affiliate of Gulf Oil Co., and Montecatini, an Italian company. This strike was reported in January 1954 in the Cigno No. 1 well near Allano at a depth of 2,560 ft, with initial production of 2,000 b/d of 34 API crude. A second well, Cigno No. 2, reportedly hit an oil stratum at 2,604 ft early in 1955 and a second at 7,544 ft during September 1955.

Early in 1957 Gulf announced it would withdraw from Italy. The company's holdings in the Abruzzi area, operated with the Italian company, Montecatini, were sold to Montecantini.

During July 1956 it was reported that Gulf's two discoveries had to be shut in due to saltwater encroachment. The company had been testing the wells under special permit pending passage of the new oil law. Four other wells on this same Abruzzi license have shown the structure to be irregular.

Meanwhile, Somicem, an affiliate of ENI, reportedly found oil in its Vallecupa well at 1,640 ft, only about 2 miles from Petrosud's well. The same company reported a discovery in September 1955 at 9,840 ft, about 62 miles south of Allano near Cerni, known as the Casalbordino well. A third discovery was reported during November 1955 near the Vallecupa discovery, known as the Madonna della Croce well, about 200 yards west of Petrosud's Abruzzi concession. It is probably an extension of Petrosud's Cigno field.

Two other new oil discoveries have been announced by ENI. The first was in Sicily at Gela, about 20 miles from Gulf Oil Corp.'s Ragusa field. Depth was 10,824-11,152 ft, reportedly in the same producing formation as Ragusa. The second discovery was a 190 b/d well in the Po valley of northern Italy, near Busseto.

Exploration concessions over 2,675,000 acres will be given out to various companies soon. Among the receiving companies (with the number of permits to be received in parentheses) are: AGIP Mineraria (a government company) (8); Societa Montecatini (7); Soc. Richerca Idrocarburi Minerali Affini (5); Cities Service Mid-East Co. (4); Soc. Mineraria Idrocarburi e Affini (3); Soc. Petrolifera Italiana (2); Soc. Emiliana Esercizi Elettrici (2); Snia Viscosa (2); Soc. Italiana Richerca (2); Soc. Idrocarburi Abruzzo (1); Soc. Azienda Petroli Italini (1); and Soc. Fondedile (1). Permits to the government's ENI group of companies are reported to total 839,000 acres of the total.

Applications received for exploration permits total 371, of which only 200 will be granted, according to the government. Many applications overlap.

Production

The only producing field in peninsular Italy (since the recent discoveries are mostly shut in) is the Cortemaggiore field in the Po Valley, which produced 65,000 tons (about 1,500 b/d) in 1954, and was up to 3,800 b/d in 1956. Discovered in 1949, it produces 35 API crude from about 6,230 ft in the Middle Miocene. Other fields reported by the government, but without production, include Ripi, S. Georgio, Tocco Casauria, and Tramutola. Reserves, as of January 1, 1956, were 110,000,000 bbl.

The government has been extremely successful in developing the gas industry. Natural-gas production has increased an average of 27% yearly during 1953-1955, totaling 3.63 billion cubic meters in 1955. It now supplies 11.5% of Italian energy requirements. During the first half of 1956, 2.08 billion cubic meters were produced, 31% above the same period in 1955. Estimated 1956 production is 4.3 billion cubic meters.

All natural-gas production is a monopoly of the government's ENI, which has 32 rigs working, 19 of them in the Po Valley. During 1955 natural gas was found in commercial quantities at Pandino, Orzivecchi, Bagnolo Mella, and Cremona. These are in addition to ENI oil discoveries at Casalbordino, Tocco Casauria, Vallecupa, Busseto, Madonna della Croce, and Gela (Sicily)—which have not yet been classed as commercial.

TABLE I

ITALIAN CRUDE PRODUCTION—1956

(Thousands of Barrels Per Day)

January	7.1	July	11.5*
February	8.0	August	12.0*
March	8.7	September	12.5*
April	8.9	October	12.1*
May	10.2	November	12.3*
June	10.4	December	12.9*
		Year	10.5*

*Estimate.

The gas pipeline network now totals 4,160 km (about 2,500 miles). This puts Italy in fourth place, only exceeded by the United States, Canada, and Russia in gas pipeline mileage.

Refining

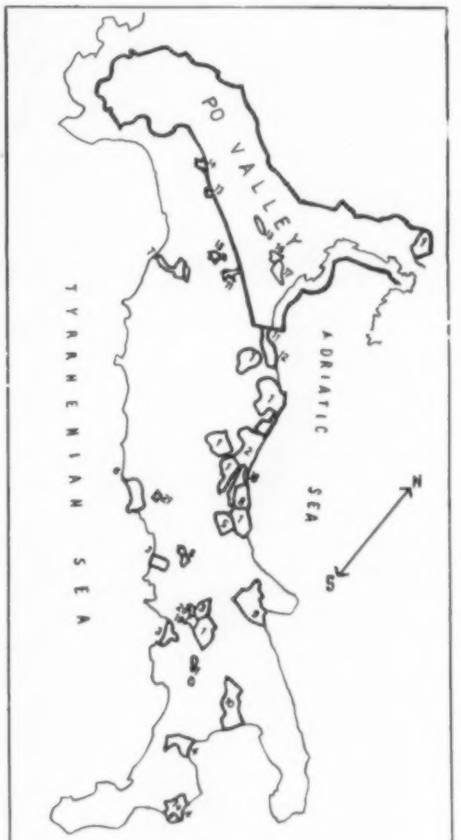
The Italian refining industry is highly developed, with a total of 30 refineries as of mid-1955, with a crude throughput capacity of 445,200 b/d, of which 33,050 b/d is thermal cracking. The total refining capacity is so far in excess of Italian consumption that an embargo on new refining construction has been issued by the government temporarily; only 72% of total capacity was used in 1955.

Refinery runs in 1955 compared with 1954 are given in Table I.

Runs in 1955 were 53.36% on "definitively imported," 28.66% on "temporarily imported," and 17.98% on "foreign contracts" basis. Residual fuel oil totaling 1,870,000 tons, intended as "temporary imports," were distributed in Italy because of the strong demand resulting from the cold winter season all over the peninsula.

Marketing

Internal consumption increased about 12.2% in 1955, mainly because of the rise in residual fuel. The increase in gasoline consumption



ITALY

Petroleum Concessions as of Jan. 1, 1956

Major Exploration Permits

1. AGIP Mineraria
2. Petrosud
3. SAMET
4. Montecatini
5. SNIA Viscosa
6. Terni
7. Dalmine
8. Chieti
9. Terra Apuliae
10. R.P.M.
11. S.I.N.
12. Metauro
13. S.P.I.
14. Petroli d'Italia
15. Lazzi
16. SAMPOR
17. SAMPOC
18. RIPEA
19. Fondedile
20. Baldini (SIM)
21. B.P.D.

(140,000 metric tons) is considered low compared with the potential market for this product.

Prices of products in Italy, as of March 1955, were 77.3 US cents retail for 74-octane gasoline, of which about 58 cents was duty and taxes (at an exchange rate of one lira equals US $0.0016). Prices are set by government regulation, and taxation of gasoline is probably the highest in the world.

A decrease in exports of 6.6% in 1955 was accompanied by a decrease in the average sale price of exported products. The decrease was the first since 1949 in products exports.

In 1955, 17,378,805 metric tons (347,576 b/d) of crude and topped crudes for treatment were imported (8.1% over 1954). Imports of finished products were slight, composed mainly of special products not manufactured in Italy.

OIL LAWS

During December 1956, the 1927 mining laws which had governed Italian petroleum exploration and development was replaced by a new petroleum law which had been debated and amended for several years. In its final form, the new law corrects several of the defects which were contained in the 1927 mining law, including the lack of any specified royalty and the absence of any guaranteed right of the discoverer of oil to a development concession over his find.

In its other phases, however, the law is disadvantageous to private operators. It imposes a heavy fiscal obligation on private companies developing production, especially when combined with the Italian income tax, which has no provision (nor is there any provision in the oil law) for a depletion allowance. In addition, it gives a favored position to the government's development company, Ente Nazionale Idrocarburi.

A special government commission is now studying the applicability of the oil law to Italy's offshore areas. The limits of these offshore areas are reportedly to be set at a vertical line at a depth of 200 meters (about 600 ft).

Principal provisions of the new oil law are as follows:

Exploring companies must be domiciled in Italy, demonstrate financial and technical capacity, and undertake minimum expenditure commensurate with the submitted program of works. In the case of competitive applications, preference will be given to the company subscribing to the largest financial commitment.

Exploration permit areas are limited to 50,000 hectares, with a limit of 300,000 hectares in peninsular Italy to one company, or 150,000 hectares in any one region. They must be symmetrical in shape, with length not more than three times their width—individual areas to be separated from each other by at least 5 km. The government's Ente Nazionale Idrocarburi is exempt from this restriction and from the total area limitation.

Each permit area must be reduced 25% at the end of the initial exploration term and 25% at the end of the first extension, area relinquished to be selected by the operator. No surface limitations were stipulated in the 1927 law.

Exploration permit's initial duration is three years, with two possible extensions of two years each, and another two-year extension given in event of discovery to permit exploitation field definition. The holder of expired or renounced permits cannot obtain rights over the same area for five additional years. Annual surface tax is 200 lire per hectare during the initial term of 3 years, 300 during the first extension, and 400 during the second and subsequent extensions. No transfer of permits is permitted unless previously authorized by the Minister of Industry and Commerce.

Conversion of the exploration permit to an exploitation concession is guaranteed over areas where discovery has been made of gas or oil, up to 75% of exploration area, provided the permittee has fulfilled all his original obligations and submitted the concession application during the validity of his permit. Total concession holdings of a company are limited to 80,000 hectares, with the government's ENI not subject to limitation. No individual concession may be larger than 10,000 hectares. Concession duration is 20 years with right to 10 years' extension, subject to government approval. The concession may be surrendered in parts not smaller than 100 hectares each, surface tax paid not refundable. Provision is made for granting of several concessions at different depths on the same area.

Surrendered areas of the concession will be auctioned to other parties on application, under terms not inferior to those of the regular concession, plus a 5,000,000-lire fee on each area, with a minimum area size of 250 hectares. Annual surface tax on the concession is 1,500 lire per hectare.

During March 1956 the royalty scale was amended to run from 2.5% on daily production per well of zero to 30 bbl, to 22% on production over 1,920 b/d. Since this royalty is on a daily production per-well basis, the royalty is considerably lower than it appears at first glance.

NATIONAL FACTORS

Although the Italian government's attitude toward foreign private investment is generally favorable, investment by foreign companies in the petroleum field has been considerably limited by passage of the new law. The government's oil exploration and development company, ENI, operates in direct competition with private companies, and has a position of monopoly in the Po valley. It has shown indications of enlarging this monopoly and, with the special privileges given it in the new law, is a formidable competitor with private enterprise.

The government's attitude toward petroleum is in sharp contrast with that of Sicily, which has special autonomous status. In 1950 Sicily passed a special petroleum law with workable provisions and, as a result of exploration which immediately began, is now producing more than 5 times as much as all peninsular Italy. The legality of the petroleum law in Sicily has been upheld by the Supreme Court in a decision subsequent to the law's passage.

In other fields, the Italian government has given substantial encouragement to investors. Legislative Decree 211, of March 2, 1948, as revised in October 1955, grants repatriation of profits in the original currency of investment at about 7% yearly and repatriation of capital at the rate of 50% yearly.

The total of taxes on corporate profits in Italy is 41.476%. This is composed of a federal profits tax of 19.928% on income from commerce and industry—although a rate of 24.356% is payable on earnings from interest on loans and deposits made with companies, a municipal profits tax of 3.861%, a provincial profits tax of 1.937%, plus a 0.75% levy on taxable assets of corporations and a tax of 15% on profits in excess of 6% of taxable assets. There is no regular dividend tax.

A convention for avoidance of double taxation is currently in process of negotiation with the United States. END

Table II—Refinery Runs in Italy
(Metric Tons)

Product		1955	1954
Gasoline		2,718,270	2,734,130
Jet fuel and kerosine		1,114,273	1,089,028
Gas—and diesel oil		3,586,282	3,155,584
Residual fuel		7,774,035	7,221,103
Lubricants		156,646	131,465
Bitumens		390,780	400,889
LPGases		280,917	200,606
Others		256,354	119,647
Consumption and losses		1,329,339	1,106,189
	Total	17,606,895	16,168,641
	Total (b/d)	352,138	323,372

Table III—Italian Product Consumption
(Metric Tons)

Product		1955	1954
Aviation gasoline		34,000	32,000
Motor gasoline		1,310,000	1,170,000
Jet fuel and kerosine		266,000	221,000
Gas—and diesel oil		1,570,000	1,417,000
Residual fuel		5,200,000	4,600,000
Lubricants		168,500	152,500
White and transformer oils		14,700	13,800
Petroleum solvents		19,000	20,000
LPGases		330,000	290,000
Paraffin wax		22,000	20,000
Bitumens		333,000	325,000
	Total	9,268,200	8,261,300

Table IV—Italian Petroleum Exports (Excluding Bunkers)
(Metric Tons)

Product		1955	1954
Motor gasoline		1,479,597	1,532,116
Jet fuel and kerosine		816,870	851,108
Gas—and diesel oil		1,613,379	1,565,945
Residual fuel		1,712,774	2,068,498
Bitumens		59,477	75,815
Others		26,291	18,485
	Total	5,708,388	6,111,967
	Total (b/d)	114,168	122,239

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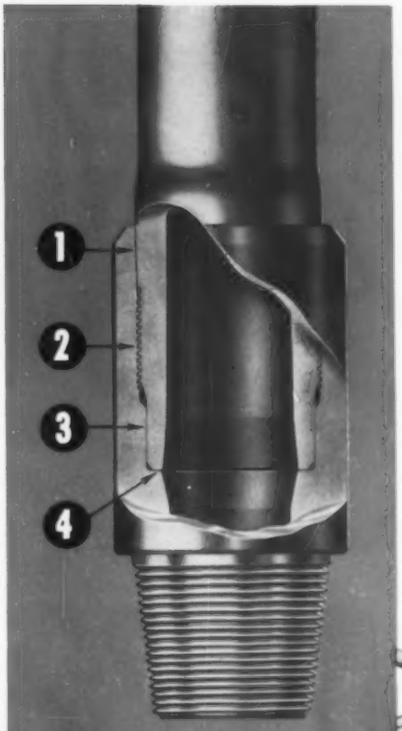

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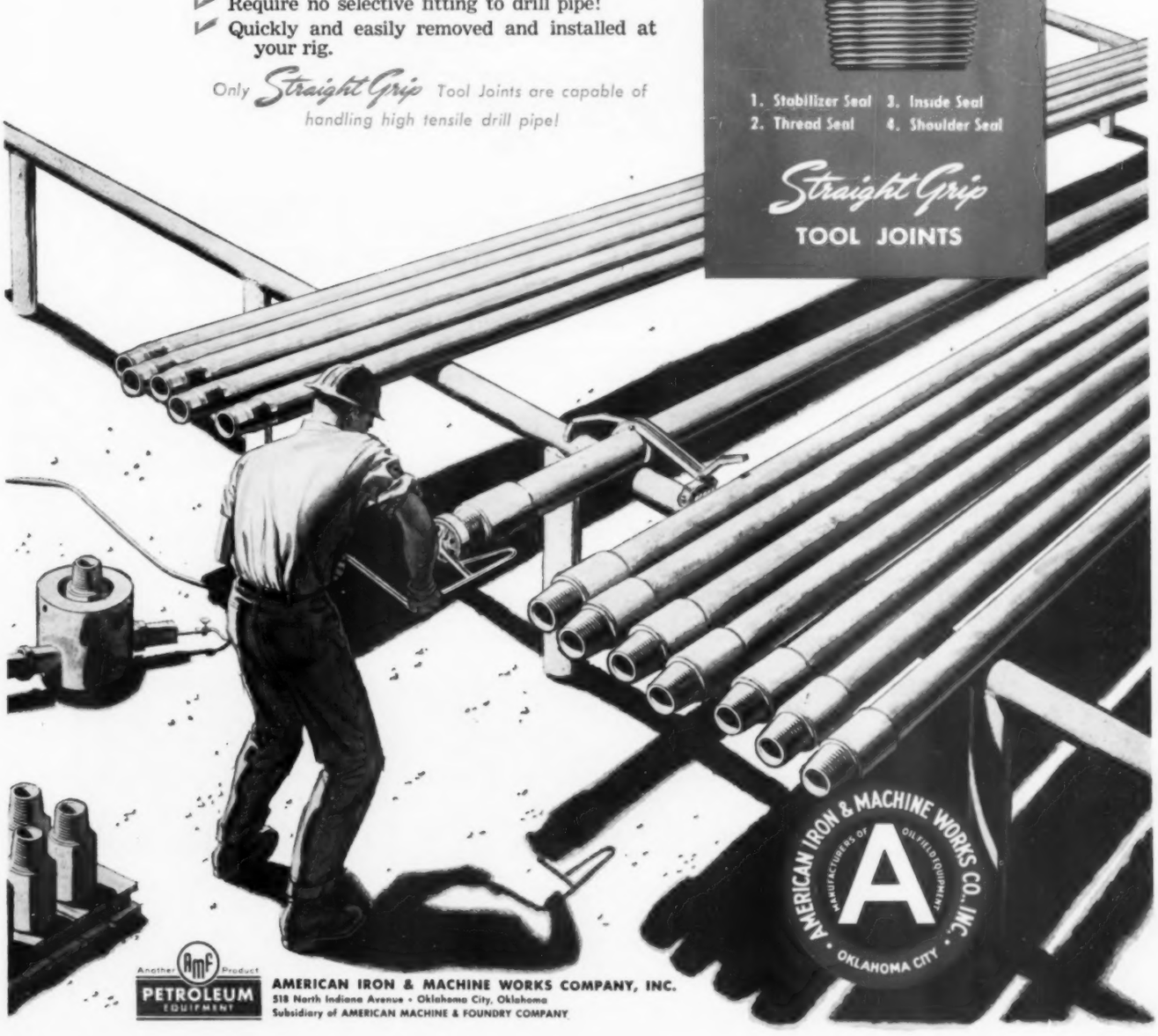

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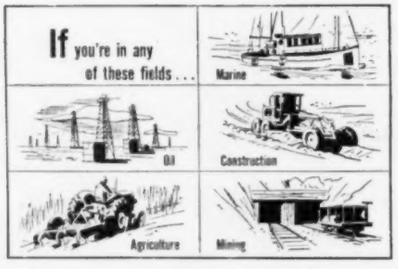

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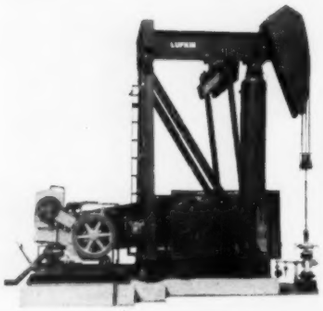

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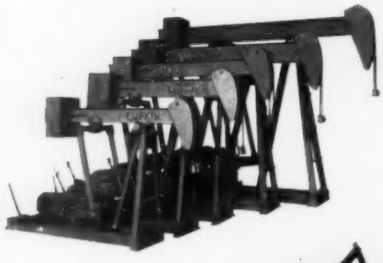

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KUWAIT

All of Kuwait's area is under concession to Gulf Kuwait Co. (subsidiary of Gulf Oil Corp., Pittsburgh) and BP Kuwait Co. Ltd. (subsidiary of British Petroleum Co., London). It is operated by Kuwait Oil Co. Ltd. owned in equal parts by the concession holders.

Exploration began soon after obtaining of the concession in 1934. The first well was drilled in 1936 north of Kuwait Bay near Al Bahara, not far from Bahrain Island where discoveries previously had been made. A dry well, it was abandoned at 7,950 ft. A wildcat which followed in February 1938 discovered the Burgan field to the south, still the principal source of Kuwait crude.

From 1942 until war's end all wells were plugged. Drilling resumed in 1945 in the Burgan field, but exploratory activity did not begin until mid-1951. In October of that year the Magwa field was discovered about 7 miles to the north. In April 1953 another field, the Ahmadi Ridge, was brought into commercial production about 9 miles northeast of Burgan. The latter two may be part of the Burgan field.

During 1955, 11 party-months of geophysical work in northern Kuwait culminated in an exploratory well at Raudhatain, about 20 miles south of the Iraq-border post of Safwat. Known as Raudhatain No. 1 and completed at 10,301 ft, this well is thought to have discovered a new field. With total pay thickness of some 2,000 ft, the well is reported to have encountered sands equivalent to those of the Burgan field and the Zubair sands of southern Iraq. A second well, Raudhatain No. 2, was drilled early in 1956, about 1.8 miles southeast of the discovery. The heavy rig was moved to a new exploratory location, Sabriya No. 1, 10 miles southeast. Raudhatain No. 2 will be tested as soon as a lighter rig becomes available.

Another wildcat is drilling at Bahra, 12 miles southeast of Sabriya, close to the first well drilled in Kuwait, near Al Bahara. Although the well was below 8,000 ft at the beginning of October, 1956, no results have been reported.

Early in 1956 the Ruler invited bids on offshore concessions, outside the limits of the area held by Kuwait Oil Co. By year-end no grants had been made.

Table I—OIL CONSUMPTION BY PRODUCT FOR 1955

Local:	Gasoline	14,646,252	Imp gal
	Kerosine	4,362,321	" "
	Gas oil	5,659,515	" "
	Diesel oil	180.50	Long tons
	Bunker oil	5,422.70	" "
	Fuel oil	34.50	" "
	Residual fuel oils*	4,478.50	" "
	Asphalt	11,032.53	" "
Export:	Crude oil	386,398,003	Bbl†
	Marine diesel oil	278,996.5	Long tons‡
	Bunker oil	1,114,322.3	" " §

* Used exclusively for oiling roads in Kuwait.
† Including 386,398,003 bbl from Kuwait (KOC) and 8,363,197 bbl from the Kuwait-Saudi Arabia Neutral Zone (AMINOIL-PACWES).
‡ Including 268,057.6 long tons refined locally, 10,938.9 long tons imported, and balance to stocks.
§ Including 854,900 long tons refined locally, 259,421.6 long tons imported, and balance to stocks. Used exclusively for bunkering tankers and cargo vessels at Mina al-Ahmedi.

Production

Kuwait has risen from the beginning of commercial production during 1946 to 1,091,800 b/d in 1955, putting Kuwait in fourth place behind the USA, Venezuela, and the USSR. Production continued to rise during 1956 until the closing of the Suez Canal.

Total production passed the two-billion-barrel mark in May 1956, the shortest time such a production level from any individual country in the world has been reached.

Total producing wells reported to be flowing as of January 1, 1956 were 185, a rise from 155 for the same date in 1955.

Production averages more than 6,000 b/d per well—made possible only by the exceptional producing formation, which is Cretaceous sandstone. Of the four major sand bodies, the third and fourth are the most productive. However, most wells are completed as multiple producers, from 3,500 ft to 4,800 ft, so the variation in productivity between sands is of lesser importance. Oil produced is uniformly about 31.0 API, with 2% to 2.5% sulfur.

Proved reserves were estimated, as of January 1, 1956, at 34 billion barrels, second only to Saudi Arabia. However, some estimates place reserves at a considerably higher figure.

Transportation

Transportation in Kuwait is relatively simple, since the Burgan field is located only 14 to 20 miles from the Persian Gulf. A network of gathering lines connects all fields to the 5,060,000-bbl tank farm at Ahmadi, on a ridge about 6 miles from the Gulf. From the tank farm, 8 lines, varying from 22-in. to 34-in., feed to the marine terminal at Mina al Ahmadi where 8 tankers at a time can be berthed for loading; in addition there are 5 submarine lines. The capacity of these loading facilities is in excess of one million b/d, the world's largest.

There is no pipeline outlet to the Mediterranean. A line planned in 1948 by Standard of New Jersey, Socony-Vacuum, and Anglo-Iranian (to be called Middle East Pipelines Ltd.) failed of the necessary agreement with Iraq.

Refining

There is only one refinery, at Mina al Ahmadi, locale of the marine terminal. As of mid-1955 capacity was 30,000 b/d, or 1,500,000 metric tons yearly. Owned by Kuwait Oil Co., the refinery has been used since construction mainly for the supply of bunker and for the small local consumption. Without cracking or reforming operations, it produces more than 55% residual fuel oil, plus some 30 tons daily of bitumen for road building.

Average runs during 1955 were 29,455 b/d. Early in 1956 Kuwait Oil Co. announced that the Mina al Ahmadi plant would undergo an expansion to about 190,000 b/d by the end of 1957. This was to be accomplished by the addition of two new atmospheric crude distillation stills of 80,000 b/d each, designed by E. B. Badger and Sons Ltd. These would increase production of middle distillates, marine diesel, and residual fuel oil especially. The recent hostilities may have delayed the completion of this expansion project.

Marketing

Consumption of petroleum products within Kuwait is very small, in 1952 totaling about 18,294 b/d. Of this, some 17,262 bbl were residual for tankers carrying Kuwait crude; so the actual requirements of the country were approximately 1,032 b/d. The largest share was 489 b/d of gasoline, followed by 363 b/d of distillate fuel oil, 175 b/d of kerosine, and 5 b/d of lubricating oils. Most of this was consumed in the town of Kuwait, which is connected with the refinery by small products pipelines.

Exports take nearly all production. Little of Kuwait's crude goes to Asian countries—with Europe the largest customer from the start of commercial production in 1946. However, the closing of the Iran fields greatly accelerated this trend. Kuwait is now the principal source of supply for Great Britain. During 1955 a total of 388,127,060 bbl of crude and products was exported, of which 386,398,000 bbl were crude.

Exports continued to rise during 1956; crude and product exports for the first 11 months of the year were 366,946,458 bbl and 952,657 bbl, respectively. Destination of crude from Kuwait Oil Co. in 1956 was: United Kingdom, 29.5%; USA 14.2%; France 13.9%; Holland, 8.8%; Aden, 7.3%—with lesser amounts to other destinations.

Much of the marketing pattern of Kuwait crude is determined by long-term purchase contracts. The first of these covered about 1.25 billion barrels of crude, and was concluded with

Table II

KUWAIT—CRUDE EXPORTS, 1955

(Thousands of Barrels)

	Crude Petroleum
United States	53,307
Argentina	11,693
Brazil	7,236
Belgium	3,929
France	49,080
Italy	27,500
Netherlands	33,943
United Kingdom	132,585
Aden	30,525
India	4,622
Japan	4,103
Canary Islands	5,794
Australia	15,375
Other	14,571
Total	386,398

the Shell group by Gulf—covering a period of 22 years with amounts ranging from 15,000 b/d in 1947 to 175,000 b/d in later years. Rather than determine a fixed price for this crude, a profit-sharing arrangement added Shell's costs of marketing, transporting, and refining the oil to Gulf's production costs, subtracted the total from the amount received from sale, and divided the resultant profit 50-50.

Another set of contracts was concluded by Socony Mobil and Standard Oil Co. (New Jersey) with Anglo-Iranian (now British Petroleum). Under these arrangements, covering 1.3 billion barrels of crude over a 20-year period, Jersey Standard is to receive 800 million barrels and Socony Mobil 500 million. The contracts were effective June 1, 1952. The price arranged was on a "cost-plus" basis, wherein to the cost of production as determined by supplier was added a fixed profit per unit.

In the distribution of the oil concerned, there were penalties attached to Gulf's contract if Gulf's sales in the Eastern Hemisphere were increased at the expense of Shell's. Jersey Standard and Socony were also limited in their sales of the oil obtained to markets in Europe and in north and west Africa—with shipments east of Suez subject to penalty for quantities over 5% of the contract amounts.

OIL LAWS

In Kuwait, petroleum activities are governed by a concession, made on December 23, 1934, between the then ruler of Kuwait, Sheikh Ahmed al fabir al Sabah, and the Kuwait Oil Co. Fiscal regulation is contained in the Kuwait income-tax decree, effective on December 1, 1951.

Term of the original concession was 75 years, and the area covered was all of Kuwait—some 6,000 square miles, not including the disputed Neutral Zone and the islands of Kubr, Qaru, Umm al Maradim, or the territorial waters of those islands. The company was subject to drilling obligations totaling 30,000 ft by December 22, 1954, but these and other terms of the original concession were lightened by revision in 1951.

The original concession called for a lump-sum payment, for annual rentals, and for a royalty of three rupees per ton produced; and, because the company was exempted from general taxes, a tax commutation payment of ¼ rupee per ton of oil produced. These amounted to about 13 cents per barrel over the decade following 1938. After the pound had been devalued in 1949 (all Kuwait payments are sterling), the payments per barrel went down to about US $0.09 per barrel. Annual "deadrent" payments were provided to cover the period of no exports. These amounted to an annual payment of 95,000 rupees (US $28,500). After exports had begun, these were replaced by an annual minimum royalty of 250,000 rupees per year (US $83,250).

PRESENT CONCESSION: In December 1951 the original concession was revised to the familiar 50-50 form already in effect in Venezuela and most of the other Middle Eastern producing countries. The term of the concession was revised to run for 17 additional years from original expiration date, or until December 22, 2026. Other provisions agreed to by the company would bring it into line with other concessions in the Middle East, including the obligation to train Kuwaiti workers and to contribute to education for Kuwaiti school children and college students abroad. Another provision, similar to others in the Middle East, was for concession revision if more favorable terms were given to any of the other Middle Eastern producing nations.

The financial provisions of the concession were revised mainly by the addition of a special income tax for petroleum companies, which raised the government's share to 50% of the company's income before deduction of foreign taxes. All the previous financial arrangements were continued. In calculation of the tax, from the gross revenue of the company is deducted the cost of production, including exploration, drilling and development costs, depreciation, depletion, and obsolescence. The result is the company's taxable income. From 50% of this income is deducted the amount of all other taxes (except foreign taxes) which were paid during the year. These include the royalty and tax exemption payments specified earlier. The difference between the total of these and 50% of the net income is payable as a tax. In the event company income is drastically reduced, there would be little or no income tax to be paid; however, royalties and other payments presumably would be payable in any case. There is also a provision (according to press sources) for a minimum payment of five million pounds sterling in the event the company ceases production entirely. All payments to the Kuwait government are made in pounds sterling, in quarterly installments.

Kuwait's terms resemble the Iraq concession terms, as does the structure of the Kuwait Oil Co. itself. As in Iraq, the company is set up as a nonprofit British organization. As originally established, Gulf and British Petroleum agreed mutually to determine production levels and share production equally, with either party given the right to request additional production for its own account. British Petroleum reserved the right to supply Gulf's needs from either Iraq or Iran, provided the price resulting to Gulf were the same as Kuwait f.o.b. price. For production from Kuwait, each of the participating companies was to pay KOC the cost of production plus one shilling per ton.

This nonprofit structure brought up some problems relative to determination of the income tax; for, if the company were nonprofit, the income tax paid could not realistically reflect its earnings, which were passed on to the parent companies. For this reason, a system of calculation of the cost of production and the f.o.b. export price of the crude was set up. Details of this system have not been revealed as yet, but it is thought to be similar to that in Iraq where the same situation prevails and the clause referring to revision in the event more favorable terms were given to any other producing Middle East nation would tend to equalize these payments.

According to press sources, the government currently receives its 50% share based on full posted prices minus a discount. This discount amounts to a total of 7%, and consists of an incentive discount ranging from 8½% on production between 20 and 50 million tons yearly to a maximum of 5% discount on the entire production. To this can be added a 2% discount given for a type of brokerage allowance, making the total of 7% on entire production.

An unusual aspect is the subjection of three big contract buyers mentioned earlier. They now are obliged to submit to taxation on the difference between their purchase price and the posted price minus the discounts permitted. In effect, this means that buyers are subject to taxation, along with producers.

Table III

KUWAIT CRUDE PRODUCTION—1956

(Thousands of Barrels Per Day)

January	1,125.1	July	1,201.4
February	1,125.4	August	1,176.6
March	1,174.7	September	1,120.6
April	1,239.5	October	1,200.3
May	1,203.7	November	561.7
June	1,149.3	December	800.0*
		Year	1,090.0*

*Estimate.

NATIONAL FACTORS

An important national factor having impact on investment climate is the utilization of oil revenues. In the sheikdom of Kuwait, one of the smallest of the Middle Eastern countries, with a total area of only 6,000 square miles and a total estimated population of 205,000 as of July 1954 (against estimated 100,000 in 1947), there are presently accruing some of the highest oil revenues in the Middle East. All of these accrue in sterling to the ruler, Sheikh Abdullah al Salim al Subah, who came to the throne January 29, 1950. They are expended principally on development plans for the economy; and, although the developmental program is stalled at present for lack of suitable personnel to fill the government's office of the Controller of Development, there is no lack of revenues for its financing. The only drawbacks are the absolute limits imposed by nature itself; for this is a predominately desert area, in which there are only a few unpotable wells, and there are few means of improving its position once the preliminary improvements in health, sanitation, public education, housing, etc., are finished. For this reason some of the revenues are being invested abroad as a source of income for times when oil revenues may drop from their 1954 level of about $1,200 per capita.

During 1948 oil company payments amounted to US $6 million; but, with revision of the concession agreements and rising production levels, these rose to about US $12.4 million in 1949. In 1950 the devaluation left revenues at approximately the same level, but with the new 50-50 concession agreement they rose rapidly to US $30 million in 1951, US $165.2 million in 1952, US $191.8 million in 1953, and to US $217.8 million in 1954. The 1954 payments level included, however, some back payments in settlement of claims going back to 1951.

On the basis of 1951 studies by the United Nations, oil revenues now provide approximately 90% of national income in Kuwait. Expenditures have been carried out under the Controller of Development, and developments include a fresh-water plant, power-plant electricity, a gas-distribution system, four state hospitals, and dental clinics which provide free medical service to all Kuwaitis, a university and technical training institute designed to become the center of engineering studies in the Middle East, and more than 50 free schools. The town of Kuwait is to be completely rebuilt within 15 years.

The contributions mentioned, in the form of payments by the oil company, are not the only source of revenues. There is also the payments from the Neutral Zone, and expenditures by the oil company in Kuwait. These all form part of the foreign-exchange revenues of the country, and serve to swell its money supply, which is based on Indian rupees, even increasing the importance of oil operations.

The extent to which the crisis at Suez has damaged British prestige and position in Kuwait remains to be seen. There is no doubt that the situation constitutes the most severe threat to date to Kuwait Oil Co.'s relations with the government. END

LEBANON

Exploration

Petroleum exploration in Lebanon was done by Petroleum Concessions Ltd., through the Lebanon Petroleum Co. Ltd. (connected with Iraq Petroleum Co.) in 1948. A 193-square-mile concession was held in the country. The company has since abandoned the concession after drilling some dry holes in the vicinity of Tripoli.

The principal petroleum concession known to exist at present is held by Cie. Libanaise des Pétroles, a French-Lebanese group. The concession is inactive at present. The company is the successor to Cie. Libanaise, a local firm which drilled a well at Yohmore in the southern Bakaa plain in association with Pacific Western Oil Corp. (now Getty Oil Co.). Getty Oil formerly had a 50% interest in 5 exploration permits covering 700,000 acres held by Cie. Libanaise. The concession agreement provided for voluntary backaway, and Getty Oil abandoned its well at 8,800 ft to move the rig to the Neutral Zone when oil was discovered there in 1953.

77.33% of the Cie. Libanaise des Pétroles may be purchased by A. S. Onassis, tanker owner, under a new arrangement. The company will issue 55,000 new shares, to be purchesed by Mr. Onassis, valued at 5.5 million Labanese pounds ($12 million)—raising total capitalization to about $16.4 million. Onassis' participation was contingent on exemption from the recent retroactive tax on income of foreign companies, which he received.

Production

There is no petroleum production in Lebanon at present, nor has there been any in the past.

Transportation

Lebanon lies on the route of the great Middle East pipelines. Two 16-in. lines, belonging to Iraq Petroleum Co., cross the country; and one 30-in. to 31-in. line belongs to Tapline, the transportation company for Aramco. IPC's lines terminate at Tripoli; Tapline's terminates at Sidon.

Until recently, pipelines were governed under separate agreements for each company—which were similar. They provided for tax-free operation and payments to the countries concerned —which were felt by the government of Lebanon to be insufficient. Accordingly, new agreements were requested and negotiated by both companies. Tapline's proposal was accepted by the government in June 1936. The company had been operating as a nonprofit company, but proposed to set up a profit-making company to manage the pipeline and split profits 50-50 with the 4 countries involved, viz., Syria, Lebanon, Saudi Arabia, and Jordan. Profits are to be figured on the difference between crude selling price on the Mediterranean and the Persian Gulf—currently about 49 cents per barrel. This would leave about $16 million to be divided among the 4 countries. All have agreed to the formula, but have not yet been able to agree on a method of division of the income between themselves. Lebanon refused to accept the IPC's proposal—which was based on mileage, as it was accepted by Syria—because of the shorter mileage traversed by IPC's pipelines in Lebanon (20 miles) which would reduce the amount of payments to the government on the ton-mile basis reached with Syria.

IPC proposed to share with the Lebanese government the profit from its transit and loading operations in the country, as related to the distance through which the oil moved as well as the volume or tonnage carried. The Lebanese government has insisted that it receive the same payment as the Syrian government receives. IPC refused, stating that such a demand would make the transportation of oil via Tripoli (Lebanon) more expensive than via Banias (Syria).

Plans for expansion of the IPC's pipeline capacity to Tripoli by an additional 9 million tons a year (180,000 b/d) have been cancelled by the company.

On June 29, 1956 the Lebanese parliament passed legislation which subjected IPC, among others, to the income tax for the first time. The Minister of State for Oil Affairs contrasted IPC's offer with that of Tapline at the same time. In a later statement he declared that all IPC properties and installations in Lebanon were government property as of May 25. Later clarification showed that this applied only in the event IPC carried through its threat to divert oil from Lebanon to Syrian terminals.

Refining

There are two refineries in Lebanon. One is at Tripoli, owned by Iraq Petroleum Co. It has 11,500 b/d crude capacity, and no cracking facilities. The other plant, owned by Mediterranean Refining Co., is at Sidon. It has 9,000 b/d crude capcity, with no cracking. The Mediterranean Refining Co. is owned 50-50 by California Texas Oil Co. Ltd. and Socony Mobil Oil Co. Inc. Construction on the plant, which opened in 1955, was shut down for awhile during a dispute with the Lebanese government over prices at which the products would be sold on the local market.

Crude runs to stills during 1955 in Lebanon averaged 17,900 b/d.

Marketing

Most internal consumption is supplied by the local refineries. During 1955 consumption averaged 16,000 b/d of crude equivalent (equal to about 14,720 b/d of actual consumption). This level is estimated to have held steady during 1956. By 1960 consumption is expected to increase to about 19,000 b/d of crude equivalent, equal to 17,480 of actual oil use.

Imports for consumption during 1954 totaled 2,486,000 bbl, or about 6,811 b/d. The total was composed of 347,000 bbl of aviation gasoline, 557,000 bbl of motor gasoline, 229,000 bbl of kerosine, and 1,353,000 bbl of diesel oil.

(Continued on page 138)

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LIBYA

Exploration

Most of the world's major oil companies are represented in Libyan exploration. Among the companies represented in Libya, as shown on the accompanying map, are: Esso Standard Libya Inc. (Jersey Standard group); Nelson Bunker Hunt (independent US oil producer); Mobil Oil of Canada (Socony Mobil affiliate); Libyan American Oil Co. (an affiliate of Texas Gulf Producing, independent of Houston, Texas) [W. R. Grace & Co., US, bought a 49% interest in Libyan American, and will advance some $7.5 million for exploration operations, including an exploratory well now being drilled in Libya]; Cie. Française des Pétroles, in which the French government has a 35% stock interest; Amerada Petroleum Co. of Libya (parent company in USA is Amerada); Continental Oil Co. of Libya (owned by Continental, US); Oasis Oil Co. (Standard of Ohio affiliate); D'Arcy Exploration (Africa) Ltd. (a British Petroleum Co. affiliate); Anglo-Saxon Petroleum Co. (Shell group affiliate); and Texaco Overseas Petroleum Co., combined with California Asiatic Oil Co.—the two latter being affiliates of The Texas Co. and Standard Oil Co. of California, respectively.

Texas Gulf Producing Co. began an exploratory well during 1956, through its subsidiary, Libyan American Oil Co., in northern Cyrenaica, east of Bengasi. Oil shows were reported in the Cretaceous, but described as unimportant.

The discovery of oil in Algeria at Edjele caused interest in that area of Libya adjoining Algeria. Cie. Française des Pétroles received a new concession on the border, and Anglo-Saxon Petroleum Co. (Shell group) applied for an additional 3,360 square-mile concession opposite the Edjele discovery.

Marketing

Since there is no producing or refining in Libya, operations outside exploration are confined to marketing. Domestic consumption amounted to 959 b/d during 1954, according to Libyan government sources. No information is available on its breakdown or on prices within Libya.

OIL LAWS

Since July 19, 1955, Libya has been governed by Petroleum Law No. 25 of June 18, 1955, with two royal decrees of May 21, 1955. Under this law, all subsoil rights (including offshore areas) in Libya are declared the property of the State. Government regulation is through a Petroleum Commission, headed by Mr. Anis Qasem.

EXPLORATION: Rights for exploration are divided into two stages. The first is the permit stage, granted for geological reconnaissance without the right to drill. Permits have a duration of one year, and application therefor must be made to the federal government, which has the legislative power, subject to the approval of the governor (Wali) of the province, who has the executive power.

EXPLORATION AND EXPLOITATION: The exploration and exploitation concessions are combined. Applicants are required to abstain from political activity and to post a guarantee of a maximum 50,000 Libyan pounds (about US $140,000).

The duration of the concession is a maximum of 50 years, with one 10-year renewal. One application may not extend over more than one zone (there are four petroleum zones in Libya), and the maximum number of concessions per applicant is three in each of the first and second zones and four in each of the third and fourth zones—with provision for more concessions grantable on approval of the Petroleum Commission. Any concession in which there is an oil or gas well does not count in these maximums.

The maximum area per concession is 30,000 square kilometers (11,583 square miles) in the first and second zones, and 80,000 square kilometers (30,888 square miles) in the third and fourth. This area must be reduced by 25% in the first five years, by 50% within eight years, and to 33⅓% of original size within 10 years for the first and second zones; or to 25% of original size for the third and fourth zones, down to a minimum of 3,000 and 5,000 square kilometers, respectively. The areas for surrender are chosen by the concession holder. The entire concession may be surrendered at any time.

Minimum annual investment in the first and second zones is 1½ Libyan pounds per square kilometer in the first 5 years, 3½ Libyan pounds per square kilometer in the next 3 years, and thereafter 6 Libyan pounds per square kilometer yearly. In the third and fourth zones, the minimum annual investment is 1½ Libyan pounds per square kilometer during the first 8 years; 3½ pounds per year during the next 4 years, and 6 pounds per year thereafter. Any amounts spent in excess of these amounts may be credited against future expenditures.

The concessionaire is subject to a granting fee of 500 pounds (about US $1,400) for each concession. Surface taxes on the concession are payable annually on each 100 square kilometers covered by the concession in the first and second zones at the rate of 10 pounds during the first 8 years, 20 pounds during the next 7 years (or until commercial production is obtained), and 2,500 pounds for each year thereafter. In the third and fourth zones, surface taxes are payable annually per 100 square kilometers covered at the rate of 5 pounds during the first 8 years, 10 pounds during the next 7 years (or until commercial production is obtained), and 2,500 pounds per concession for each year thereafter.

When oil is discovered, a royalty of 12½% field value of production minus field use is payable, which replaces the surface taxes. The value of the crude is the free-market price of similar crude laid down in the nearest Libyan port or other port with posted price, minus handling and transportation costs to production site. The same royalty is payable on natural gas produced and sold.

The concessionaire is subject to the general taxes of Libya. If the total of taxes, however, falls short of 50% of net profits after the concessionaire has attained an export level of 15,000 b/d for 30 consecutive days, or after 4 years have elapsed, then the government may assess a surtax to make taxes equal to 50% of net profits. If payments exceed 50%, the difference is deductible from payments to the government.

Among the deductions available to the concessionaire are all exploration and intangible drillings cost, cost of noncommercial wells, and costs of initiating operations in Libya, capitalized or deducted at the option of the concessionaire. Investments may be amortized at a rate not exceeding 20% yearly and 10% after 4 years or when 15,000 b/d exports have been reached.

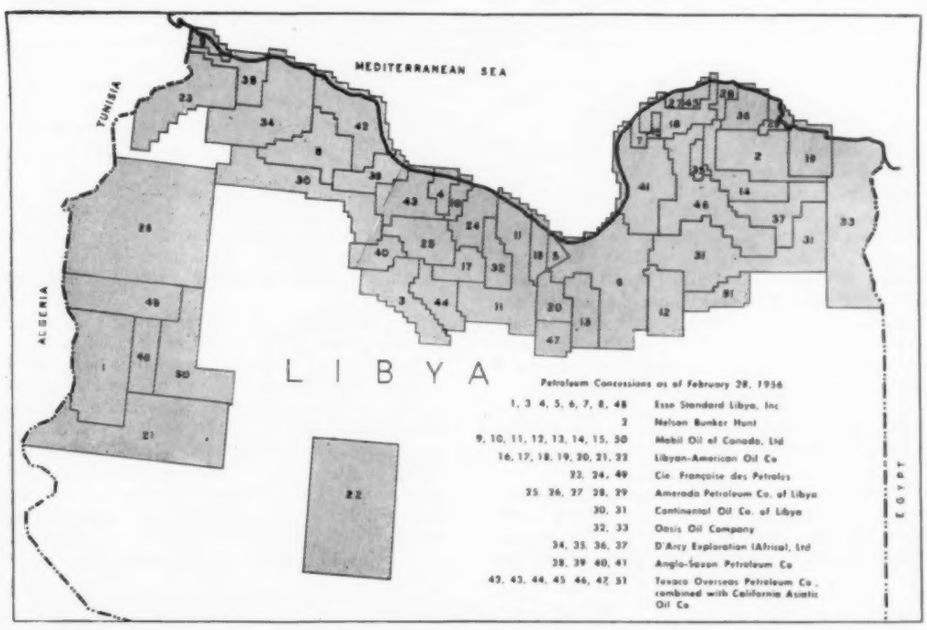
There is also deductible a depletion allowance equal to 25% of gross income up to 50% of net income after deductions listed previously. When the total of deductions exceeds gross income before deductions, the difference may be brought forward and credited against profits for 10 years. This depletion allowance does not come into operation until the 15,000 b/d export level is reached for 30 days.

The concessionaire is exempted from import duties on plant, machinery, tools, equipment, and materials used in operations. All goods so brought in, and all petroleum exported, are free of any export duty or license.

REFINING AND TRANSPORTATION: Any concessionaire who discovers oil has the right (but not the obligation) to establish and own a refinery in accord with the laws which prevail at the time of construction. The government may require the refiner to furnish his pro-rata share of domestic consumption, provided this does not entail additional construction.

Any concessionaire having surplus pipeline capacity must make the same available to other persons on terms conforming with normal petroleum practice.

END


MEDITERRANEAN SEA
TUNISIA
ALGERIA
EGYPT
LIBYA
Petroleum Concessions as of February 28, 1956
1, 3, 4, 5, 6, 7, 8, 48 Esso Standard Libya, Inc
2 Nelson Bunker Hunt
9, 10, 11, 12, 13, 14, 15, 50 Mobil Oil of Canada, Ltd
16, 17, 18, 19, 20, 21, 22 Libyan-American Oil Co
23, 24, 49 Cie. Française des Petroles
25, 26, 27, 28, 29 Amerada Petroleum Co. of Libya
30, 31 Continental Oil Co. of Libya
32, 33 Oasis Oil Company
34, 35, 36, 37 D'Arcy Exploration (Africa), Ltd
38, 39, 40, 41 Anglo-Saxon Petroleum Co
42, 43, 44, 45, 46, 47, 51 Texaco Overseas Petroleum Co., combined with California Asiatic Oil Co

Lebanon

(Continued from page 135)

OIL LAWS

Oil in Lebanon is regulated by Decrees No. 113/LR and 133L/R, issued August 9, 1933 and June 23, 1936, respectively, by the French High Commissioner in Syria and Lebanon.

The law provides also for special terms if the concession is approved by parliament. The petroleum concession, granted in 1955 to Cie. Libanaise des Pétroles and ratified by the parliament, deviates substantially from the standard terms, particularly with respect to the payments to be made to the government. According to the terms of this concession, which covers about a third of the territory of Lebanon, the company is to pay to the government the following share of its net profits:

Annual Production (Millions of Tons)	*Government's Share of Total Net Profit (%)*
0-1	15
1-3	20
3-4	25
4-5	30
5-6	35
6-7	40
7-8	45
8 or over	50

Natural deposits of mineral ores are classified in seven categories—oil and gas being in the sixth.

EXPLORATION: An oil exploration permit applies to a square area, the sides of which are directed north-south and east-west and which are 10 km long, or to a group of such squares provided adjoining squares have a common boundary of at least 2.5 km.

An application for an exploration permit must be filed with the chief of the Bureau of Mines.

The permit has an initial duration of four years. It can be renewed twice, each renewal good for three years. If the license holder has complied with the license provisions, and has carried out a works program which will permit him to estimate the exact limits and productivity of any structure or structures, he has a right to a first renewal. A second renewal is granted if the license holder can prove that it was impossible for him to gather adequate information in order to estimate the exact limits and productivity of the structure area.

The license fee during exploration is 5,000 Lebanese pounds for the first 3-km square block, 1,250 Lebanese pounds for the second to fifth block, and 250 Lebanese pounds for additional blocks.

EXPLOITATION: Exploitation concessions are granted at the request of the license holder, and include all or part of the exploration permit area. If later it is found that the concessionaire needs a larger area, he may apply therefor.

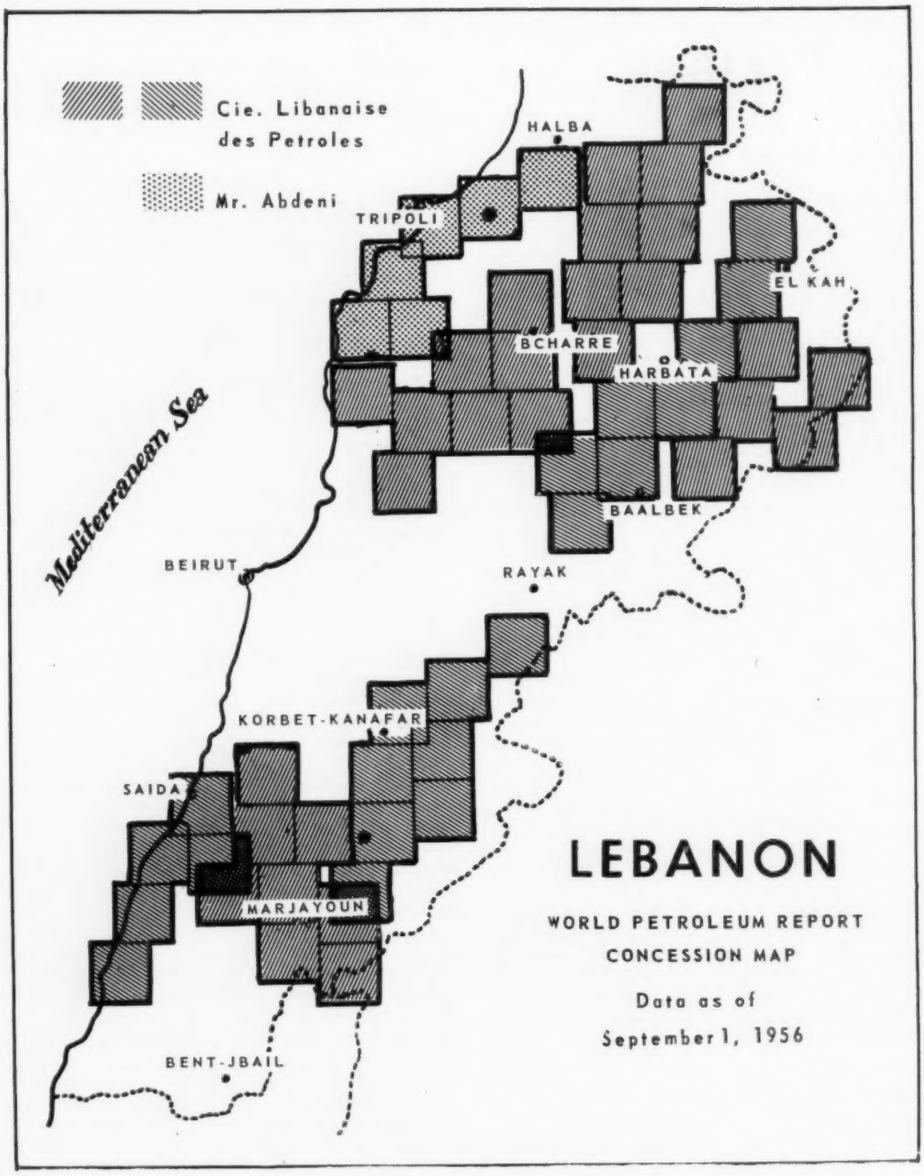
Royalty on liquid hydrocarbons is 5% on the first one million tons (7,000,000 bbl, approximately); 15% on the second one million tons; and 7.5% in excess of two million tons.

On natural gasoline, the royalty is 2.5% of the value in the field. These royalties can be revised by agreement with the government.

Transfer of the concession must include the whole area, except with special authorization. The concessionaire who desires to give up all or part of his concession can apply to the chief of the Bureau of Mines.

Fees per hectare are 0.05 Lebanese pounds per hectare during the third year, and three Lebanese pounds per hectare during the fourth and following years.

Duration of the exploitation concession is 75 years, which may be extended for an additional 25 years.



New petroleum concessions, should any be granted, may deviate from the standard concession terms on the scale of payments to the government.

NATIONAL FACTORS

The attitude of the government is generally favorable to petroleum investment, in spite of recent difficulties with Iraq Petroleum Co. There are no restrictions on the ownership by foreigners of business enterprises in Lebanon other than public utilities and aviation companies, where at least one-third of the capital must be owned by shareholders of Lebanese nationality. The government generally encourages private enterprise as a matter of historical tendency, derived from Lebanon's position as a center of trade and international finance.

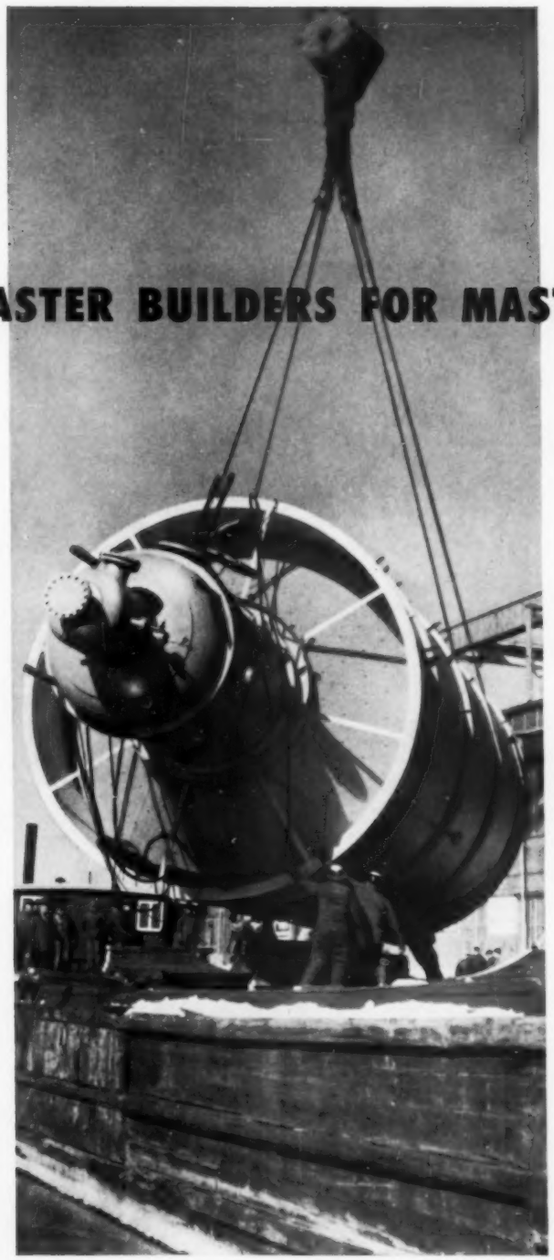
Income-tax rates range from 5% on income of 5,000 Lebanese pounds or under up to 42% on income of 500,000 Lebanese pounds ($1.09 million) and over.

Legislation enacted on Febrauary 5, 1954 exempts from income tax, for a period of 6 years from the date of formation, companies established within 5 years of the enactment of the law which are found by the Council of Ministers to meet the following conditions:

1. If the enterprise is different from any already established in Lebanon, and if it will increase national production and develop the country's economy.
2. If the capital employed in Lebanon amounts to at least 1 million Lebanese pounds at the time of its establishment.
3. If the total wages and salaries paid to Lebanese workers and employees exceed 100,000 Lebanese pounds per year.
4. If the company commences its operation within a period to be specified in the exemption decree.

The par value of the Lebanese pound is 2.19148 equals USA $1. These rates apply only to certain government payments; all other transactions take place at the free market rates which are prevented from falling below Lebanese pounds 3.20 per USA $1. In general, no requirements are attached to exchange payments nor receipts in Lebanon. In some cases transactions with certain countries, with which Lebanon has concluded payments' agreements specifying the method or channel of payment, may be made through specific accounts. END

OIL FOR TODAY AND TOMORROW



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BEARING FRUIT

MEXICO

Since 1938 the petroleum industry of Mexico has been a monopoly of the government through Petroelos Mexicanos, known as Pemex. Therefore, there are no concession holdings by private companies; but, beginning in 1948, drilling contracts, as later described, have been let to foreign companies.

Exploration

Exploration performed has been extensive, but has not resulted in any major oil finds. Several minor discoveries have been made, including the Ocotepec-Ordonez area in 1952, the Angostura field in 1953, and the Tecolutla field in 1954. During 1955 Pemex reported fifteen new productive oil and gas "fields" at: Allende, Chote, Acuatempa, Vicente Guerrero, Alazan Oriental, Temapache Oriental, Macarena, Nuevo Progreso, Chichimantla, Tres Higueras, and Tecuilolapa, in Vera Cruz; Canon and Berrendo, in Tamaulipas; El Pato, in Nuevo Leon; and Bitzal, in Tabasco. During early 1956 three more oil fields were located: Tamaulipas (state of the same name); and Mesa Cerrada and Agata, in Vera Cruz. Of the new fields discovered in 1955, the most important appear to be those of Guerrero, Allende, Acuatempa, and Chichimantla, which enlarge the New Golden Lane producing belt. Most of the fields reported, however, are extensions of fields previously discovered.

Pemex drilled 330 wells in 1955, about 13% over 1954. Total footage was 1,790,880. Average depth was 5,427 ft. This drilling was a record for Mexico, exceeding the former record year of 1926, when 1,764,640 ft were drilled. The 1956 schedule called for 450 wells, including 72 wildcats.

Production

Mexican production has fluctuated strongly over the years. It dropped sharply after the expropriation; then began to rise slowly to 210,569 b/d in 1952; dropped to 198,445 b/d in 1953; and rose again to 226,800 b/d in 1954. During 1955 it rose again to 244,704 b/d of crude, according to Pemex, or 251,016 b/d including distillates and absorption gasolines. This production was mainly from the old Poza Rica fields discovered in 1930, which contributed 64,146 b/d.

March 1956 production was 265,930 b/d (of which crude was 249,764 b/d), originating 98,300 in Poza Rica and 168,630 elsewhere. This output will rise to 282,000 b/d, according to Pemex, as soon as the Angostura field is put into capacity production through completion of the oil pipeline to Vera Cruz, and termination of repairs to wells in Panuco and on the isthmus.

Production is predominately of heavy crude, although several of the new discoveries have been producers of lighter and more valuable crude. In addition, production has been lower than total productive capacity, due to lack of transportation.

Crude proved reserves ,as of January 1, 1956, were approximately 1.9 billion barrels by US estimates.

Refining

The government monopoly of Pemex also extends to refining, and there is no mention of refining in recent drilling contracts. The only nongovernment plants are minor, such as small 1,000 b/d skimming plant at Juarez, operating on Texas crude.

The total refining crude throughput of Mexico in 1956 was 428,500 b/d. This exceeds domestic consumption; however, there arise certain problems which prevent domestic refining from completely satisfying domestic needs.

The first of these is the location and output of refineries. Most of them were built during the pre-expropriation period. Their output is mostly of residual fuel oil designed for the export trade, and there is only about 46,500 b/d of cracking capacity.

This output does not conform to domestic demand patterns. In addition, since the refineries were originally designed for export, more than 60% of capacity is located on the Gulf of Mexico. Because of their location, the refineries have not been able adequately to supply all of domestic demand, due mostly to the inadequate internal transportation system of Mexico. This situation has been met by the importation of products to areas in shortage, primarily those of the north and west—although completion of a new Tampico-Monterey pipeline will reduce imports.

Refining output of major products in July 1956 was 217,129 b/d, or 6,731,000 bbl. The total was composed of 1,498,000 bbl of gasoline, 671,000 bbl of kerosine; 3,697,000 bbl of fuel oil; 445,000 bbl of diesel fuel oil; 57,000 bbl of lubricating oils and greases; 109,000 bbl of asphalts, and the remainder of other products.

Correction of refining deficiencies is presently being attempted through a Six-Year Plan to end in 1958. Among the improvements planned are additions to the refineries listed in Table II to add catalytic capacity and increase export capacity in light oils, overcoming Mexico's traditional handicap of low-gravity low-value crude and residual fuel-oil exports.

Transportation

Distribution of products to the internal market presents difficulties because of the configuration of territory, which hampers land transportation of petroleum. The zones most affected are those farthest from the refineries including (1) Monterrey-Torreon-Chihuahua; (2) Zacatecas-Durango; (3) Oaxaca-Chiapas; and (4) the west coast.

The problem is not scarcity, since there is an abundant supply of products available, but involves the speed and availability of transportation. In 1955 Pemex shipped 1,890,359,000 liters by highway at a 10 million peso loss—the difference between the charges for this service and what would have been charged had the same amount been moved by rail.

One method of relieving this situation is transportation by pipelines, which have already been built from Minatitlan to Salina Cruz, from Salamanca to Morelia, Salamanca to Lagos-Guadalajara and Aguascalientes, as well as that under construction from Tampico to Victoria and Monterrey. A pipeline is planned from Guaymas to Obregon City and Navojoa, another between Guaymas and Hermosillo, and plolongation of the Tampico-Monterrey line to Torreon.

Marketing

The rise in domestic consumption has been about 9% yearly since the end of war. The outstanding feature of this increase has been the rise of gasoline consumption, which has gone from around 20% of total consumption of petroleum products to about 33%, and in kerosine, which has risen to around 10.5% from 4.5%. Residual fuel oil has declined in importance to 48% from 56%. Distillate fuel oil is about 10.8% of consumption. Total 1956 consumption is estimated at 228,780 b/d. By 1960, consumption is estimated to rise to 307,830 b/d.

The imbalance between this domestic consumption and domestic refining output will be seen on comparison with the figures given for refining. The refinery output is distorted away from domestic needs, especially in the gasoline and kerosine sectors.

The recent external marketing of Mexico has been marked by a sharp increase in imports and a decrease in recent years of exports. The typical external marketing pattern in Mexico is an exportation of crude, usually of the heavier gravities, and an importation of products. The value of product imports is generally higher than that of exports due to the higher prices of the finished products—although, volume-wise, exports are much higher.

Imports during 1955 totaled 41,370 b/d, valued at 71.4 million. Of this total, gasoline and residual fuel oil were the largest components. The principal factors influencing this composition of imports are, first, the product output of the over-age Mexican refining industry, which is unable to keep up with the rising gasoline consumption; and, second, the poorly developed internal transportation system as it is aggravated by the unhandy location of refineries. The latter factor is principally to blame for the imports of residual, since domestic refining capacity is higher than local consumption on this product. 70.3% of 1955 imports were by Pemex. The rest were by local distributors.

The Mexican export trade suffered severely when export outlets were cut off following the 1938 expropriations. It has since recovered to about 60,000 b/d, 70,777 b/d in 1955, according to Pemex. This export total is composed about 60% of crude oil, 40% of products. Although before 1938 there were substantial quantities of gasoline and other products exported in addition to residual fuel oil, rising domestic consumption and other factors had reduced export markets for products almost exclusively to residual fuel oil.

A recent development of importance was the 20-year contract to sell 10,000,000 cu ft to 200,000,000 cu ft of natural gas daily to the Texas

TABLE I

MEXICAN CRUDE PRODUCTION—1956

(Thousands of Barrels Per Day)

January	269.2	July	247.7
February	249.8	August	252.6
March	264.9	September	265.5*
April	254.3	October	254.0*
May	246.0	November	253.1*
June	249.9	December	254.0*
		Year	255.1*

*Estimate.

TABLE II—MEXICAN REFINERY CAPACITY

Company	Location	Capacity—Type Crude		Cracking Capacity
Petroleos Mexicanos	Arbol Grande, Tampico	40,000	SAL	—
	Atzacapoltzalco, D.F. (1)	100,000	SCA	14,500 T
	Ciudad Madero, Tampico (2)	85,000	SCA	6,000 T
	Mata Redonda, Vera Cruz	14,000	SC	6,000 T
	Minatitlan, Vera Cruz (3)	50,000	SC	15,000 C
	Poza Rica, Vera Cruz	94,500	S	—
	Reynosa, Tampico (4)	7,000	S	—
	Salamanca, Gto. (5)	38,000	Comp.	5,000 T

(1) 30,000 b/d vacuum unit, 20,000 b/d catalytic cracker, 3,000 b/d alkylation unit and 800 b/d cat poly unit planned for construction.

(2) 12,000 b/d catalytic reforming capacity. Crude capacity to be increased to 102,000 b/d; a catalytic cracker, alkylation, polymerization, and coking units under construction; complete early 1957.

(3) Lube plant under construction; complete November 1957.

(4) 10,000 b/d additional distillation capacity and a 2,200 b/d thermal cracking unit planned for construction.

(5) A 15,000 b/d catalytic cracker under construction.

S—Skimming. L—Lubricating. A—Asphalt. C—Cracking. T—Thermal.

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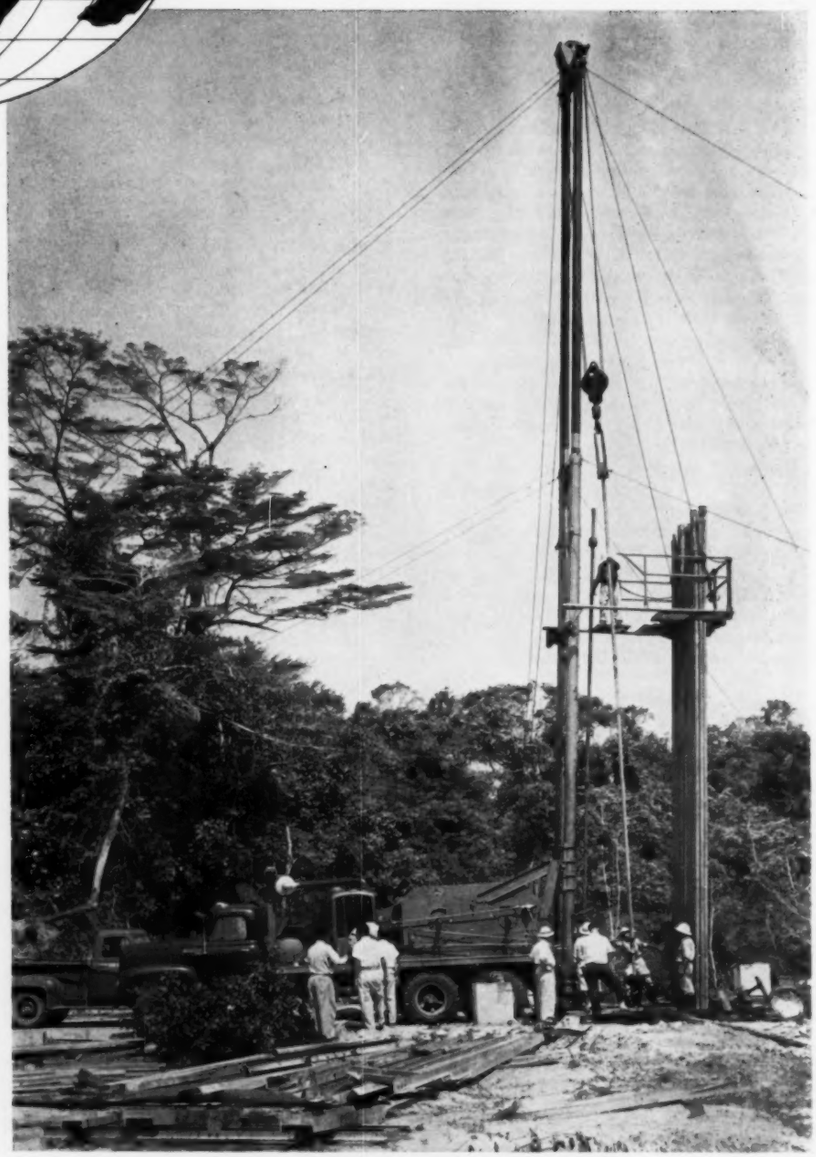

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Eastern Corp., in the USA, at an initial price of about 14.2 cents per MCF. The gas will be processed in Mexico's new plant at Reynosa, and income to Pemex will be US $125 million to US $250 million over the 20-year period—contributing substantially to the 1956 development program. The agreement recently received Federal Power Commission approval from Washington, D. C.

OIL LAWS

Oil laws were very liberal in their treatment of foreign capital until the passage of the Constitution of 1917. Art. 27 of that constitution vested ownership of the subsoil in the government. A series of decrees followed, culminating in the Petroleum Law of December 26, 1925, amended in 1928, and subsequent expropriation.

The present controlling petroleum legislation is the Reglementary Law to Art. 27 of the Constitution, promulgated November 16, 1941.

Under the 1941 law, exploration, development, or any other petroleum activity can only be carried out by means of government contracts with private parties or persons, or by the government through a special public entity (such as Pemex) or through its own organization, the General Bureau of Mines and Petroleum. Contracts with private persons may only be with Mexican companies or citizens or "mixed" companies wherein the government holds majority stock ownership. Regulation by the government is through the Secretariat of National Economy.

DRILLING AND PRODUCTION CONTRACTS: Although government or public petroleum entities may not cede their rights, Sect. III of Art. C of the 1941 law gives them the right to conclude contracts with private parties for exploration or exploitation, but without ceding any of their rights or responsibilities under such contracts.

These have taken the form of drilling and production contracts, and there have been several concluded since 1948. The first was in April 1948 with Cities Service Co. wherein the latter was to provide capital for exploration of some one million acres held by Cities Service previous to the 1938 expropriation. Cities Service agreed to finance Pemex up to $10 million, giving technical advice and information and supplying material for the work. The $10 million was to be paid back within 10 years. In event of discovery, Cities Service has an option to purchase up to 50% of production at from 15 to 35 cents below market price, depending on the quantity purchased.

Another agreement was concluded in March 1949 with Compania Independiente Mexicana Americana, SA, known as CIMA. It was owned by American Independent Oil, Signal Oil and Gas, and Edwin Pauley. This is a drilling contract, in which CIMA makes all necessary investments for exploration over certain areas. In return, CIMA receives proceeds from the sale of 50% of production from CIMA wells, plus 15% of proceeds from land areas, 16¼% from lagoons, and 18¼% from marine areas, using Texas Gulf values for comparable crudes as a basis. CIMA is not subject to taxes on any of these receipts. Pemex retains control and supervision of operations. Duration of the contract is 25 years. CIMA has an option to purchase any additional production available after Pemex' domestic needs have been met.

A second series of contracts was concluded in 1950 by Pemex with Sharpless Oil Co.'s Mexican subsidiary, Sharmex SA and Independent Exploration Co.-Edwin Pauley combination. Under this contract, drilling may be carried on for 12 years over a total of 60,000 acres in the Reynosa area. This total is divided into 15,000-acre parcels, and on each drilling must begin within 30 days of selection. All costs are borne by the foreign companies, and no rights of ownership are acquired. All drilling programs are subject to Pemex' approval and supervision. If production is obtained, wells will be produced by Pemex and the companies are repaid their exploration and drilling expenses from 25% of the value of sale of production from their discoveries, or from 50% if they agree to purchase part of production. Presumably, a discount similar to the CIMA contract is given on these purchases. The amount of such purchase is also presumably limited to production available after domestic needs of Pemex have been satisfied.

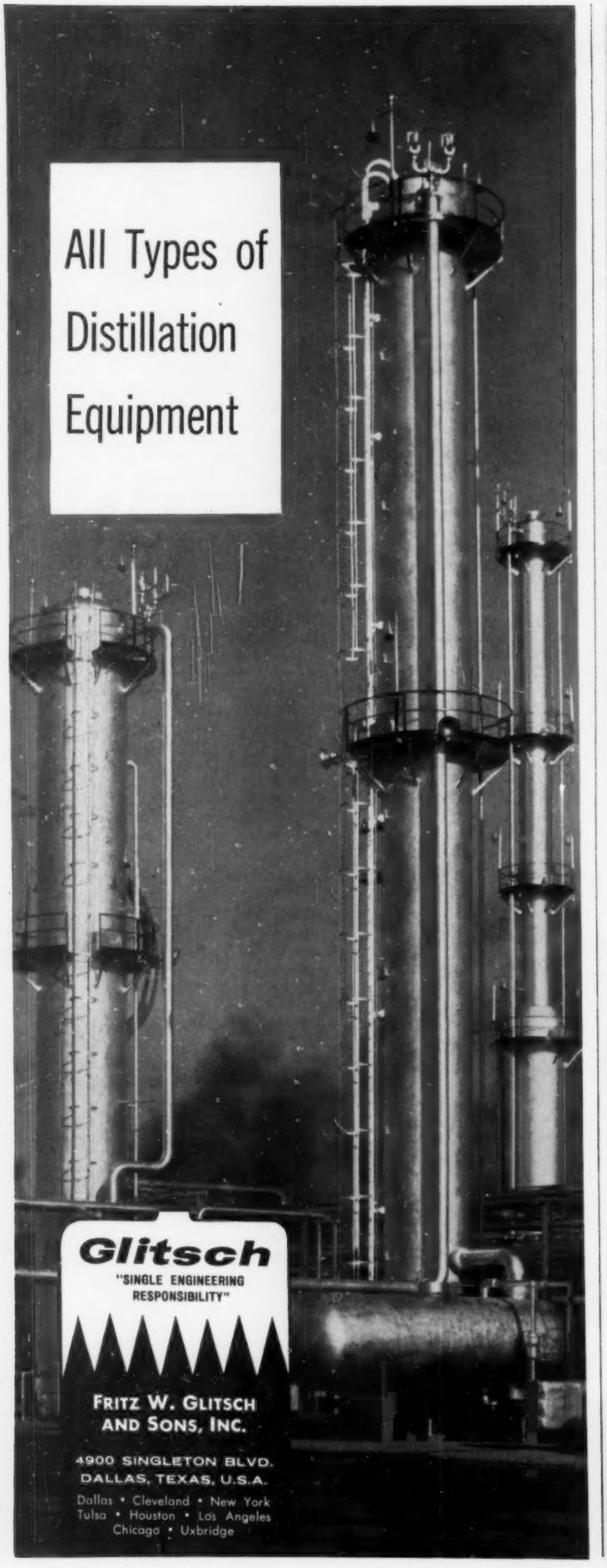
The companies are exempt from all taxation. If contracts are entered into by Pemex on more favorable terms in similar areas with other parties, the companies may receive the same terms. A guaranty of $500,000 must be posted until expenditures have passed 10 million pesos. Differences regarding the contract are subject to arbitration.

As compensation from the contract, the companies receive 15% of the value of sales of production over a 25-year period. If no production is obtained, the companies receive no compensation for investments made or risks assumed.

NATIONAL FACTORS

Given the present governmental monopoly over petroleum, which shows no signs of being relaxed, operations by foreign private capital are possible only under contract with Pemex. These contracts are about half as profitable as a "normal operation" in the foreign field would be. As a result, none of the major producers in Mexico has returned under the contract setup.

END



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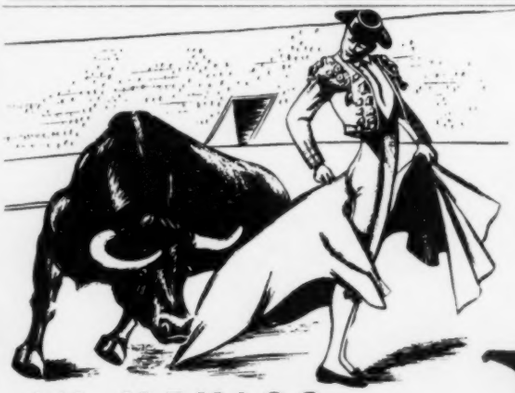
Branches Throughout the Oil Country



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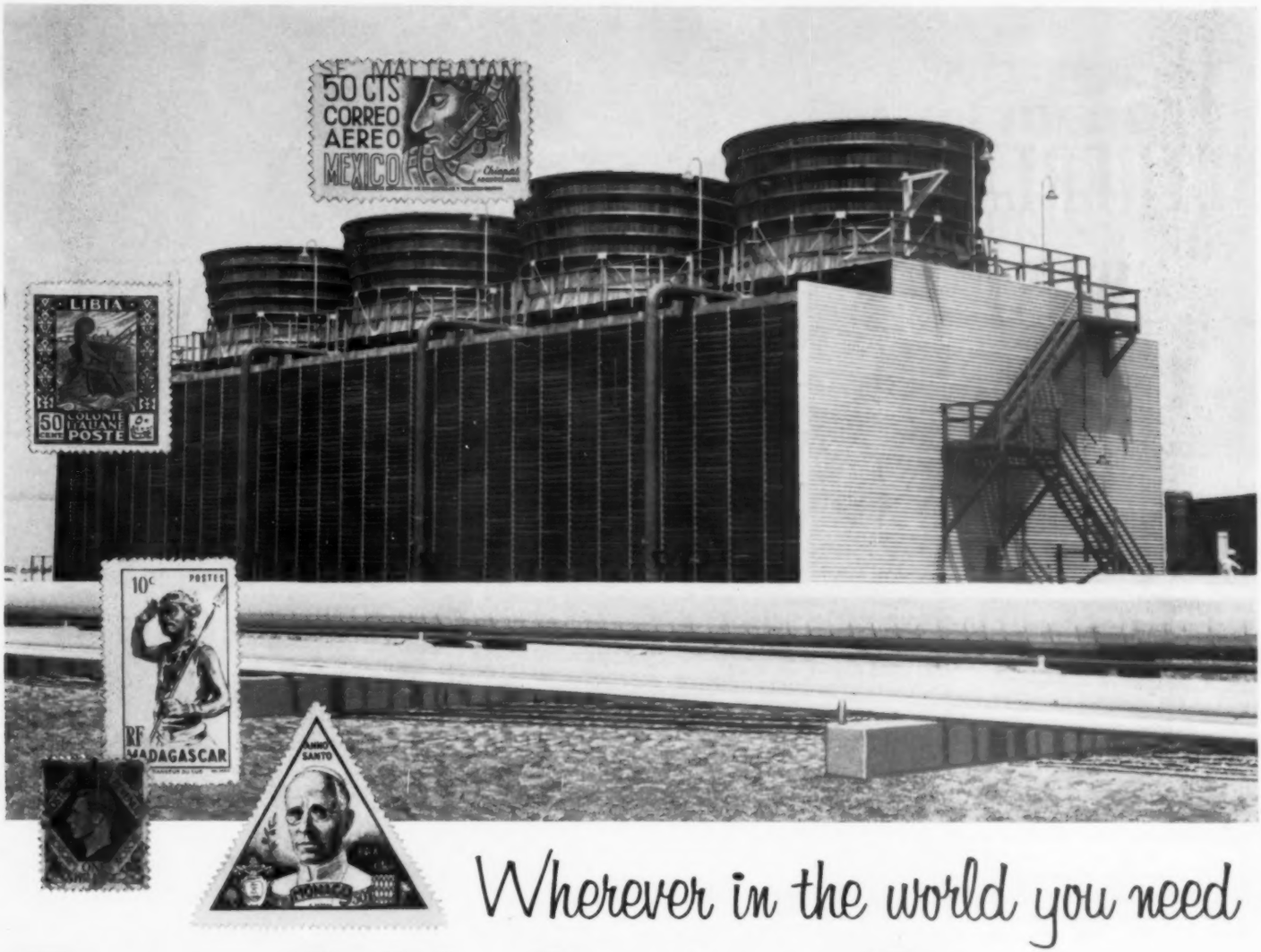

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In many countries (and the list grows constantly) Marley is represented by efficient local organizations who readily can furnish on-the-spot assistance in solving technical, legal, labor and exchange problems. Many are staffed to construct Marley towers—all have had Marley training.

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NETHERLANDS WEST INDIES

There is no production or exploration taking place in the six islands which comprise the Netherlands West Indies; instead the islands, especially Aruba and Curacao, derive their importance in the old industry from refining and oil trans-shipment operations.

There are two large refineries, owned by Lago Oil and Transport Co., an affiliate of Standard Oil Company (New Jersey), and by N. V. Curacaosche Petroleum Industrie Mij., a Shell affiliate. The combined capacities of these refineries is 650,000 b/d, with 487,000 b/d cracking capacity.

The islands are heavily dependent on the employment afforded by the oil refineries, with the labor force in Lago amounting to about 6,500 persons. Considerable effort is being made by government of the Netherlands West Indies to stimulate foreign investment and considerable tax and other advantages have been offered new industries.

Exports from the islands amounted to 849,584 b/d during 1955, with the United States being the largest market, followed by the United Kingdom.

NETHERLANDS WEST INDIES REFINERIES
(Barrels Per Day)

Company	Location	Crude Capacity	Cracking Capacity
N. V. Curacaosche Petroleum Industrie Mij.	Curacao[1]	210,000 Comp.	120,000 T
	Aruba[2]		
Lago Oil & Transport Co.	Aruba[3]	440,000 Comp.	367,000 TC

[1] 16,000 thermal reforming capacity. A 33,000 b/d catalytic cracker and a 30,000 b/d feed plant are under construction, to be completed during mid-1957.
[2] Closed down.
[3] 16,000 b/d thermal reforming capacity. Middle distillate upgrading facilities increased end 1956.
T—Thermal. C—Catalytic. Comp.—Complete.

NETHERLANDS ANTILLES, EXPORTS—1955
(Thousand Barrels)

	Crude Petroleum[1]	Gasoline	Kerosine	Gas and Diesel Oils	Fuel Oil	Lubricants	Asphalt	Other	Total
Canada	—	2,311	1,724	1,948	3,707	—	—	—	9,690
Mexico	—	34	—	—	—	—	—	—	34
Newfoundland	—	—	—	—	673	—	—	—	673
United States	1,256	788	2,638	2,820	84,136	—	4	7,259	98,901
Total North America	1,256	3,133	4,362	4,768	88,516	—	4	7,259	109,298
Costa Rica	—	260	33	156	225	—	—	3	677
El Salvador	—	382	132	149	111	—	—	5	779
Guatemala	—	732	92	224	486	—	9	5	1,548
Honduras	—	150	20	213	267	—	—	—	650
Nicaragua	—	404	122	343	50	—	—	—	919
Panama	—	769	131	2,163	3,158	1	—	3	6,225
Total Central America	—	2,697	530	3,248	4,297	1	9	16	10,798
British Antilles	—	289	199	797	1,783	1	—	22	3,091
Cuba	—	2,442	—	774	5,006	4	—	—	8,226
Dominican Republic	—	668	81	337	379	4	7	6	1,482
French Antilles	—	81	48	20	80	1	—	—	230
Haiti	—	325	27	212	94	2	—	2	662
Netherlands Antilles	—	332	72	3,495	2,628	3	—	—	6,530
Puerto Rico	—	131	48	15	1,715	—	—	38	1,947
Virgin Islands	—	23	6	264	61	—	—	—	354
Total Antilles	—	4,291	481	5,914	11,746	15	7	68	22,522
Argentina	946	416	171	1,556	12,988	46	—	1	16,124
Bolivia	—	22	—	—	—	—	—	—	22
Brazil	—	6,567	2,109	3,314	5,171	162	—	833	18,156
Chile	—	1,024	497	431	1,107	26	—	179	3,264
Colombia	—	2,250	409	399	—	10	—	—	3,068
Ecuador	—	—	—	24	12	—	—	—	36
Guianas	—	1	—	—	—	1	—	—	2
Paraguay	—	292	66	99	43	2	—	—	502
Peru	—	—	—	—	712	2	—	—	714
Uruguay	1,877	182	378	125	611	—	—	—	3,173
Venezuela	—	606	3	—	—	36	—	2	647
Total South America	2,823	11,360	3,633	5,948	20,644	285	—	1,015	45,708
Belgium	658	149	42	818	1,092	—	—	—	2,759
Canary Islands	—	74	—	2,131	2,605	—	—	—	4,810
Denmark	—	838	29	741	1,025	1	—	288	2,922
Finland	—	5	60	513	417	—	—	—	995
France	4,482	271	—	—	102	31	—	—	4,886
Germany	1,972	122	—	3,418	2,003	302	—	—	7,817
Greece	—	127	4	93	668	—	—	—	892
Iceland	—	195	72	129	—	—	—	43	439
Ireland	—	—	—	—	—	—	—	214	214
Italy	919	722	—	—	—	—	—	—	1,641
Netherlands	1,078	1,051	747	1,981	1,474	942	—	252	7,525
Norway	—	295	188	2,496	2,035	—	—	1	5,015
Portugal	—	685	310	1,113	765	12	—	103	2,988
Spain	—	273	116	—	132	3	—	23	547
Sweden	—	2,527	1,340	1,892	1,279	97	—	3	7,138
Switzerland	—	21	17	39	16	—	—	—	93
United Kingdom	3,973	4,403	4,453	3,315	4,847	2,204	—	997	24,192
Total Europe	13,082	11,758	7,378	18,679	18,460	3,592	—	1,924	74,873
India	—	—	109	—	—	191	—	1	301
Israel	—	64	1	—	627	—	—	2	694
Japan	—	391	—	—	—	—	—	—	391
Lebanon	—	89	2	—	—	—	—	—	91
Malaya	—	513	1	—	740	—	—	—	1,254
Saudi Arabia	—	26	—	—	—	—	—	—	26
Syria	—	103	2	—	—	—	—	—	105
Turkey	—	53	—	10	—	34	—	—	97
Total Asia	—	1,239	115	10	1,367	225	—	3	2,959
Australia	525	572	—	—	—	113	—	27	1,237
Indonesia	—	—	—	—	—	—	—	1	1
New Zealand	—	408	—	—	—	15	—	—	423
Total Oceania	525	980	—	—	—	128	—	28	1,661
Africa	—	3,645	1,029	2,719	6,162	190	—	174	13,919
Other countries	—	389	234	6,804	17,891	19	—	51	25,388
Sub-total	17,686	39,492	17,762	48,090	169,083	4,455	20	10,538	307,126
To whaling grounds	—	2	—	244	2,726	—	—	—	2,972
TOTAL	17,686	39,494	17,762	48,334	171,809	4,455	20	10,538	310,098

[1] Re-exports of crude petroleum produced in Venezuela and Colombia.
Source: Ministry of Mines and Hydrocarbons of Venezuela, via U.S. Bureau of Mines.

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WORLD-WIDE GUIDE

WORLD-WIDE GUIDE

to Dresser Equipment and Technical Service

Concise though condensed, this World-Wide Guide contains illustrations and capsule descriptions of Dresser equipment and technical services readily available to customers in both hemispheres. Information on the extensive engineering and manufacturing facilities of each Dresser company is provided herein, followed by product data and listings of representatives in most parts of the world.

This Guide will serve a useful and timely purpose, so vast and fast is the global growth of industry in general, the oil, gas, chemical and electronic industries in particular.

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(Pages 5-8)

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(Pages 9-12)

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DRESSER MANUFACTURING DIVISION, Bradford, Pa.—Pipeline couplings, pipe repair sleeves and clamps, weldments, forgings, compression fittings, saddles, expansion joints, flanges and rings.

(Pages 13-16)

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(Pages 17-20)

IDECO

IDECO, Dallas, Tex.—Hydrair* and Power Rigs; Full-View* Masts; Substructures; Single, Dual and Drive-In Rambler Rigs; Blocks, Swivels, Rotaries; Mud Pumps; Petroleum Equipment and Supplies.

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LANE WELLS COMPANY

LANE-WELLS CO., Los Angeles, Calif., Houston, Tex., Oklahoma City, Okla. – Electric and Radioactivity Well Logging, Koneshot* perforating and bullet perforating, packers, and bridging plugs.

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MAGNET COVE BARIUM CORP., Houston, Tex.—Mines, processes and distributes Magcobar* and Magcogel* drilling muds and other specialized oil well drilling fluids and chemicals.

(Pages 29-32)

PACIFIC PUMPS, INC., Huntington Park, Calif. – Centrifugal pumps for refineries, power stations, pipelines, chemical plants, utilities and marine service. Plunger pumps for oil wells.

(Pages 33-36)

ROOTS-CONNERSVILLE BLOWER DIVISION, Connersville, Ind. – Rotary positive blowers, gas pumps, centrifugal blowers and exhausters, vacuum pumps and positive displacement meters.

(Pages 37-40)

SECURITY ENGINEERING DIVISION, Dallas, Tex., Whittier, Calif. – Complete line of rock bits, reamer rock bits and hole openers; reamers, casing scrapers and Neo-Red rubber stabilizers.

(Pages 41-44)

SOUTHWESTERN INDUSTRIAL ELECTRONICS, Houston, Tex. – Seismograph systems, instruments and accessories – electronic, electro-mechanical. Computers – analog and digital; recording systems. Voltmeters, special transformers and reactors.

(Pages 45-48)

*TRADE MARK REGISTERED

INDEX TO DRESSER EQUIPMENT AND TECHNICAL SERVICES

Dresser products and technical services described in this guide are listed alphabetically below. The name of the Dresser company supplying each item is shown, as well as the number of the page giving basic product information. Data on each of the eleven Dresser operating companies is condensed into individual four-page units which also list the names and addresses of licensees and representatives outside the United States.

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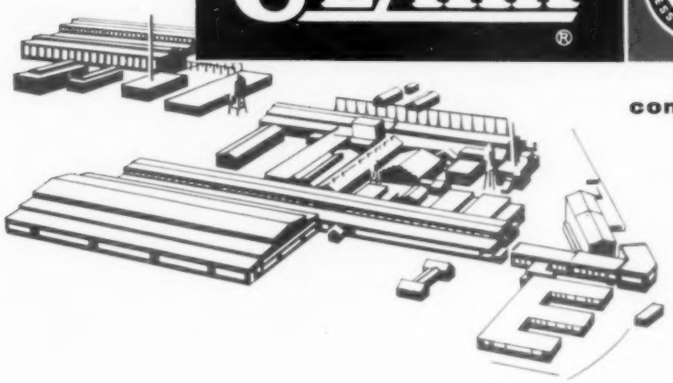
Weighting Materials	Magcobar	30
Workover Surface Equipment	Guiberson	19



CLARK®

ONE OF THE DRESSER INDUSTRIES

compressors • engines • gas turbines

Precision By The Ton

CLARK BROS. CO.

OLEAN, N. Y., U. S. A.

Clark Bros. Co. operates the largest plant in the world devoted exclusively to the manufacture of heavy duty compressors and compressor drivers. Clark products are known and used world wide.

In addition to its manufacturing facilities in Olean, N. Y. and Bradford, Pennsylvania, Clark has also licensed the manufacture of its products in Canada, Great Britain, France and Italy. Users of Clark products outside of the United States, therefore, can obtain equipment which is in every way equal to "built in Olean" quality with whatever currency is most favorable to them.

Clark compressors are widely used in the petroleum, gas and process industries and to an ever growing extent in general industry.

In the petroleum industry, Clark compressors are used in the production of crude. The Clark Air-Pac is used in the aerated mud drilling process while the "Midget Angle" and Model CFA aid in gas lifting wells and in gathering gas.

Clark "Right Angle" compressors and the new turbo-supercharged Models TLA and TRA are used in the larger gas gathering plants, in cycling plants and in pressure maintenance plants.

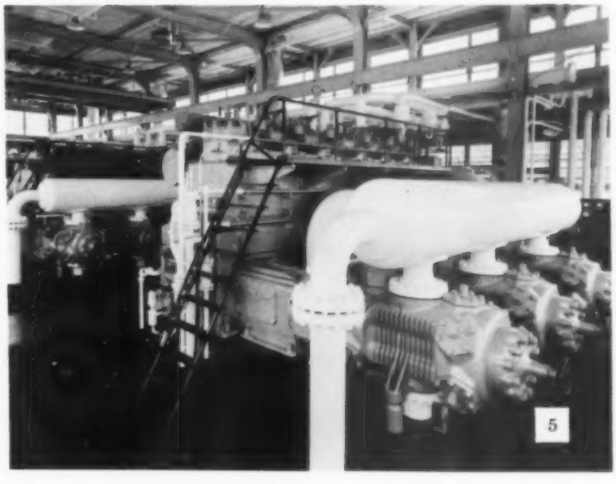
In the main refineries all types of Clark compressors are used for various services. In the newest reforming processes, many Clark centrifugal compressors are used.

Closely tied to the refining industry are the expanding petrochemical plants. Here again all types of Clark reciprocating and centrifugal compressors are used. The new Clark gas turbines are also being installed in petrochemical plants to drive Clark centrifugal compressors. The chemical and process industries are also heavy users of Clark compressors.

Some of the largest Clark installations are to be found on the major gas transmission pipelines where Clark turbo-supercharged compressors, centrifugal compressors and the Clark gas turbine are used.

A growing number of Clark motor-driven balanced/opposed compressors are being used by general industry for the compressing of air for plant requirements.

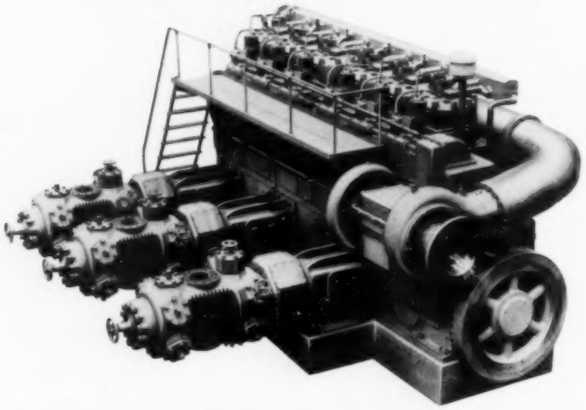
Wherever air or gas is to be compressed at pressures of up to 36,000 pounds per square inch and in volumes of up to a billion cubic feet per day, Clark has a compressor to do the job.



Four Clark 2000 horsepower turbo-supercharged gas-engine-driven compressors installed on a major gas transmission pipeline.

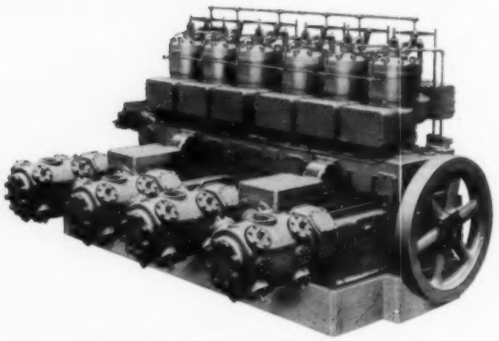
CLARK®

Reciprocating



TURBO-SUPERCHARGED COMPRESSORS

Clark 2-cycle turbo-supercharged gas-engine-driven compressors and engines are built in seven different sizes covering the 1100-3400 BHP range. These units are particularly economical to install and operate because of turbo-supercharging. They are widely used throughout the gas, refining and process industries.

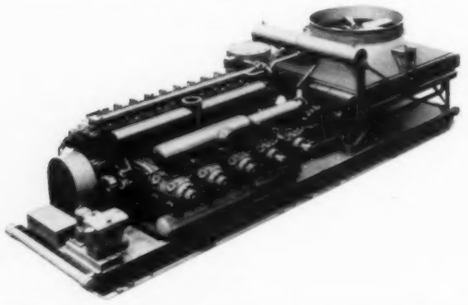


"RIGHT ANGLE" COMPRESSORS

Clark Model HSRA gas-engine-driven compressors have been installed in vast quantities in the refining and gas industry. These non-turbocharged units are available in a range of sizes covering the 400-1100 BHP range. They are also built as diesel-engine-driven units with 330-880 BHP ratings.

SKID MOUNTED "MIDGET ANGLE" COMPRESSORS

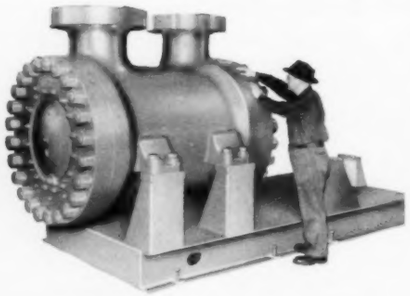
Clark "Midget Angle" compressors are available as skid mounted compressor stations complete with compressor, radiator, scrubbers and all necessary auxiliaries. The Model HMAB is built in 330, 440, and 550 BHP sizes, while the smaller HMA is built in 175, 265, 350 and 440 BHP sizes.



Centrifugal Compressors

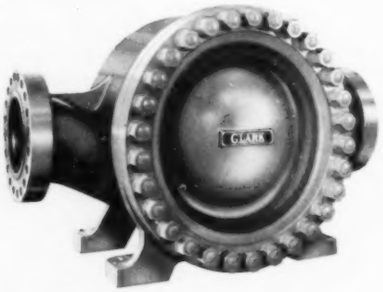
HORIZONTALLY-SPLIT CENTRIFUGAL COMPRESSORS

Clark multi-stage, horizontally-split centrifugal compressors are extensively used in the refining and process industries. They are built in seven case sizes having from two to ten impellers each. Capacities of 1000 to over 150,000 CFM can be accommodated.



VERTICALLY-SPLIT CENTRIFUGAL COMPRESSORS

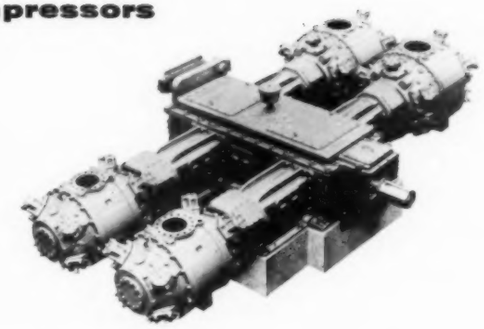
Clark multi-stage, vertically-split centrifugal compressors are designed for extremely high pressures. They are built in four case sizes covering a capacity range of 500-20,000 CFM. Available with cast or forged steel cases, they are used in the majority of reforming plants.



CENTRIFUGAL PIPELINE BOOSTERS

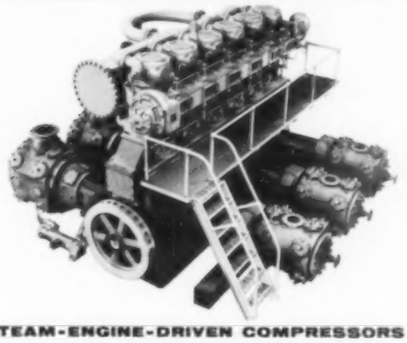
Clark centrifugal pipeline compressors are specifically designed for gas transmission pipelines. They are designed for maximum efficiency at low compression ratios. They can handle capacities measured at inlet conditions of over 30,000 CFM at pressures in excess of 2000 psi.

Compressors



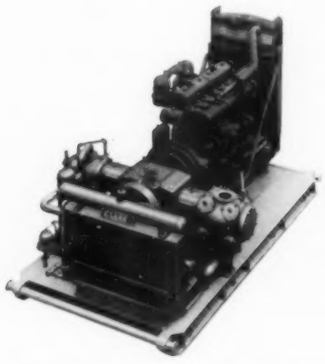
MOTOR-DRIVEN COMPRESSORS

Clark balanced/opposed motor-driven compressors are built in five stroke sizes covering the 100-6000 BHP range. Because of the balanced/opposed principle, these units are practically vibrationless in operation. As air and gas compressors they are used throughout industry. Pressures to 36,000 psi can be handled.



STEAM-ENGINE-DRIVEN COMPRESSORS

Clark Model SCRA compressors are of the "Right Angle" Unaflow design. Many of the process industries use them for synthesis applications. They are built in two, three, four, five, six and eight cylinder models of 500-3200 BHP each.



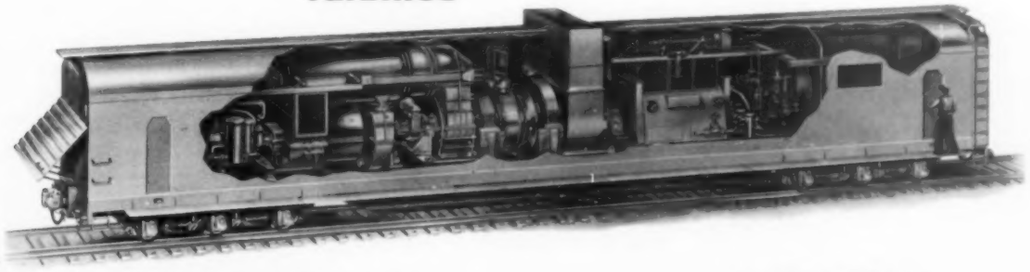
SKID MOUNTED ENGINE-DRIVEN COMPRESSORS

Clark Model CFA compressors consist of a Clark balanced/opposed compressor, radiator and scrubbers mounted on a rigid steel skid together with a gas, gasoline or diesel engine to drive it. The CFA is ideal for field gas gathering or gas lifting. Models are available in the 75-200 BHP range.

AIR-DRILLING COMPRESSORS

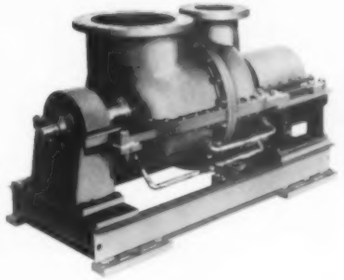
The Clark Air-Pac is a "packaged" air compressor station specifically designed for aerated mud drilling. It is a 500 horsepower, completely automatic unit which is belt driven from the draw-works compound. It consists of a Clark balanced/opposed compressor, a radiator and all necessary auxiliaries mounted on a rigid steel skid.

Turbines



GAS TURBINES

Clark gas turbines can be used for driving centrifugal compressors, pumps, generators or other moderate to high speed loads. They are built in size range of 1130-8500 BHP and can be had with or without regeneration. A 6200 KW self-contained mobile power station, mounted in a single railroad car, is also available.

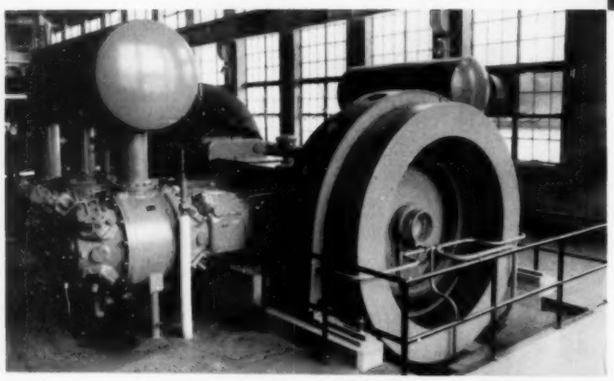


POWER RECOVERY TURBINES

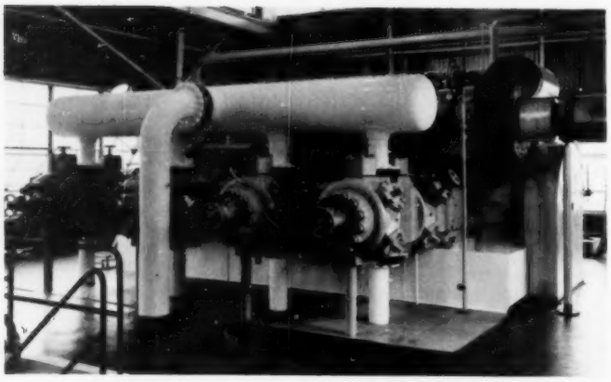
Clark axial and radial inflow power recovery turbines are used to reclaim energy from hot exhaust gases. The radial inflow unit is also used in refrigeration cycles. Turbines are direct connected to any high speed load such as a centrifugal compressor. Sizes range from up to 5,000 CFM measured at inlet conditions.

CLARK®

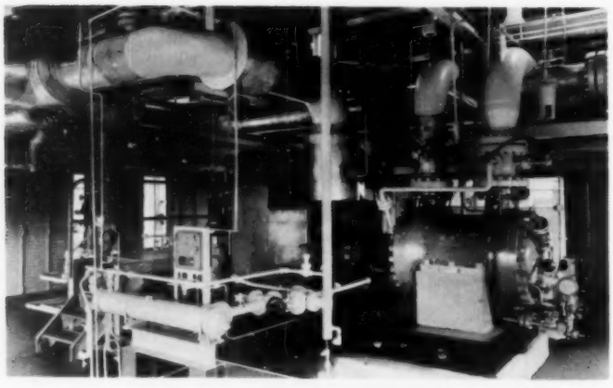
compressors
engines
gas turbines



Clark 2000 horsepower balanced/opposed motor-driven compressor installed in a Michigan automotive plant.



Clark Model TRA-8 turbo-supercharged gas-engine-driven compressors installed in Texas gas gathering plant.



A Clark barrel type, vertically-split centrifugal compressor operating in an Ohio reforming plant.

CLARK BROS. CO.
Olean, New York, U.S.A.
One of the Dresser Industries

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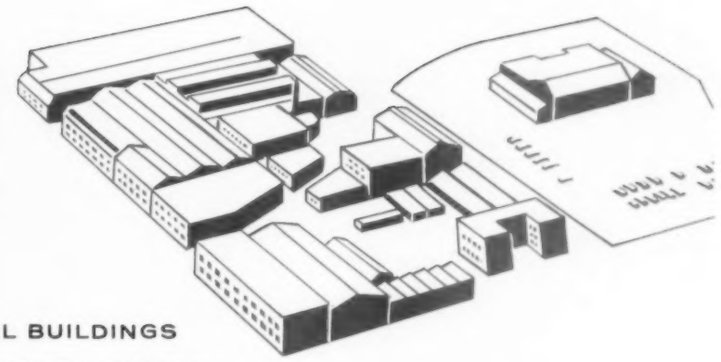
DRESSER
IDECO

ONE OF THE DRESSER INDUSTRIES



Designers and fabricators of

STEEL BUILDINGS

AIRCRAFT HANGARS

ELECTRIC POWER SUBSTATIONS

RADIO AND TV BROADCAST ANTENNA TOWERS

MICROWAVE AND RADAR TOWERS

DRESSER-IDECO COMPANY

COLUMBUS, OHIO

Founded in Columbus, Ohio in 1920 as the International Derrick and Equipment Company, to produce steel oil well derricks, Dresser-Ideco, as it is known today, became one of the Dresser Industries in 1944. Since its inception, Dresser-Ideco has gained an important position in several structural steel fields.

High towers for broadcasting stations (both radio and TV) and for radar networks—steelwork for sub-station structures—standard steel buildings for manufacturing, warehousing and commercial and institutional uses—standard steel hangars to accommodate aircraft of all sizes—these are major fields in which Dresser-Ideco has established a position of prominence.

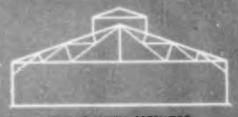
Pacing the metal-building industry's steadily increased sales volume, Dresser-Ideco has expanded its production facilities and its line of pre-designed, shop-fabricated metal buildings to include a variety of basic styles and sizes ranging from small utility structures to giant 300′ clear span aircraft hangars. And it was Ideco's backlog of experience in radio tower design which enabled this Dresser company to pioneer the triangular TV tower design which has become foremost in tall tower design and construction. Ideco has built over half the U.S.A.'s TV towers over 1000 feet tall, including the tallest structure in the world . . . a 1,572 foot tower at Oklahoma City, Oklahoma.

Known as a leading supplier to the oil and gas industry since 1920, the Ideco trade mark is now being recognized throughout the U.S.A. and the Western Hemisphere as a symbol for superiority in the design and fabrication of specialized steel structures.

Ideco designed and prefabricated CR 5 compressor station, Michigan Gas Storage Co., Muskegon, Michigan. Ideco deep-rib steel sheet gives a trim, clean-lined appearance. These flexible, functional steel buildings are custom-tailored to meet each particular need... yet offer the economies of standardized construction.

MONITOR TYPE IDECO BUILDINGS

Monitors can be added to any gable style IDECO building type.



GABLE WITH MONITOR

GABLE WITH MODIFIED MONITOR

BOWSTRING TYPE IDECO BUILDINGS

BR-5 SINGLE SPAN

Spans: 60', 70', 80', 90', 100', 120', 150', 160', 180'.
Wall Heights: all spans 16'; spans 80' and up, 18' or 20'; spans 100' and up, 22' through 36'.

BR-5 MULTISPAN

Spans: Multiple of 2 or more of the spans shown above.
Wall Heights: same as BR-5 above.

SELF-SUPPORTING IDECO BUILDINGS

S-10 Gable

Spans: 2' increments from 6' to 24'.
Wall Heights: 8', 10', 12'.

S-10 MULTIGABLE

Spans: multiple of 2 or more of 16', 18', 20', 22', 24'.
Wall Heights: 8', 10', 12'.

RIGID FRAME IDECO BUILDINGS

CR-5 GABLE

Spans: 16', 20', 24', 28', 30', 32', 36', 40', 46', 50', 60', 70', 80'.
Wall Heights: 8', 10', 12', 14', 16'.

CR-5 MULTIGABLE

Spans: Multiple of 2 or more of the spans shown above.
Wall Heights: 8', 10', 12', 14', 16'.

UTILIMASTER

Spans: 40', 50', 60'.
Wall Height: 14'.
The rigid bent is fabricated from an expanded tapered beam, rather than from regular wide flange beam.

MILL TYPE IDECO BUILDINGS

MR-5 GABLE

Spans: 16', 20', 24', 28', 30', 32', 36', 40', 46', 50', 60', 70', 80', 90', 100', 120', 150'.
Wall Heights: all spans 8', 10', 12', 14'; spans 24' and up, 16'; spans 46' and up, 18' or 20'; spans 80' and up, 22' or 24'.

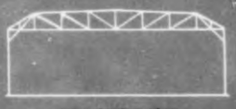
MR-5 MULTIGABLE

Spans: Multiple of 2 or more of the spans shown above.
Wall Heights: same as MR-5 Gable above.

MR-5 CRANE STYLE

Spans: any MR-5 Gable span above for center portion, plus lean-to (on either or both sides) 16', 20', 24', 30'.
Center Bay Heights: 26', 28', 30', 32'.
Lean-to Wall Heights: same as Wall Heights MR-5 Gable above.

TOP-LIGHT TYPE IDECO BUILDINGS



MR-6 SINGLE SPAN

Spans: 10' increments 40' through 100'.
Wall Heights: 2' increments 12' through 24' (all spans).

MR-6 MULTISPAN

Spans: Multiple of 2 or more of the spans shown above.
Wall Heights: same as MR-6 Single Span above.

MR-6 CRANE STYLE

Spans: Any MR-6 Single Span above for center portion, plus lean-to (on either or both sides) 20', 24', 28', 30', 32', 36', 40'.
Center Bay Heights: 26', 28', 30', 32'.
Lean-to Wall Heights: same as Wall Heights MR-6 Single Span above.

FLAT ROOF TYPE IDECO BUILDINGS

FR SINGLE SPAN

Spans: 40' through 100' in 10' increments.
Wall Heights: 12' through 30' in 2' increments.

FR MULTISPAN

Spans: Multiple of 2 or more of the spans shown above.
Wall Heights: Same as FR Single Span.

FR CRANE STYLE

Spans: Any FR Single Span (above) for center position, plus lean-to (on either or both sides) 40' through 100' in 10' increments.
Center Bay Heights: 12' through 30' in 2' increments.
Lean-to Wall Heights: 12' through 30' in 2' increments.

Ideco MR5 prefabricated steel warehouse building 40' x 60' x 12', designed to meet the particular needs of K. T. Oil Company, Wichita, Kansas.

Ideco MR5, 60' x 30' x 8' with built-up masonry front, used as show room by Sam H. Denny Road Machinery Co., Wichita, Kansas.

Quality Steel Buildings

For Commerce and Industry

For over thirty years, Ideco industrial, commercial and institutional buildings have been dependably serving users throughout the U.S.A. and Western Hemisphere. These buildings have demonstrated their ability to meet a wide variety of requirements. They have proved, also, that better quality steel buildings, in the long run, are the best investment.

Ideco buildings are available in six basic types—see sketches to left and below.

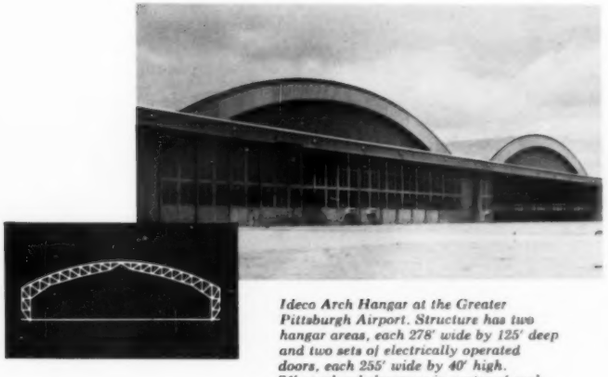
Buildings of 24 foot span and under are built on the skin-stress principle widely used in aircraft design. Ideco sheeting is designed to sustain compression and binding loads so that these smaller buildings are normally self-supporting. Steel framing may be used in these buildings, however, to support hoists or other special loading.

In buildings of more than 24 foot span, a structural frame reinforces the sheeting. Four types of framing are available—the rigid frame type in which the columns and rafters are rigidly joined to form a continuous bent, and the mill, bowstring and flat roof types in which the frames are made up of conventional columns and trusses.

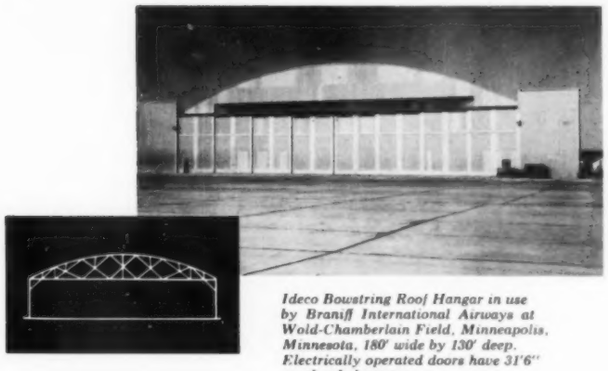
Ideco buildings can be erected with varying wall and roof treatments... in Deep-Rib steel sheet, steel panels, brick or masonry walls and steel or built-up roofs. Full insulation readily applied. Ideco is equipped to develop an all-steel structure, steel in combination, or to shop-fabricate the structural steel members to *your* specifications.

Erection of Ideco buildings is fast, easy, economical. No field cutting, burning, welding or drilling of structural members or heavy gauge formed members is required. Sheets are all shop cut to exact size, including beveling for gable sheets and openings for doors, windows and ventilators. Roof sheets and roof insulation are applied from above... no interior scaffolding or crew is required. Anchor bolts and anchor bolt plans are shipped in advance of the building...the foundation can be completely finished and ready for erection when the building arrives.

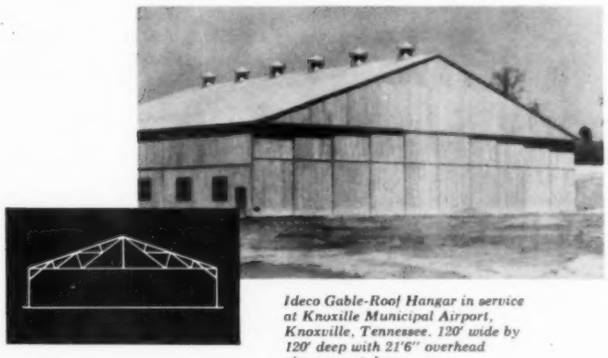
In considering your requirements as to type and size, consult detailed specifications in the sketches below and at the left.



Ideco Arch Hangar at the Greater Pittsburgh Airport. Structure has two hangar areas, each 278' wide by 125' deep and two sets of electrically operated doors, each 255' wide by 40' high. 71' overhead clearance in center of each hangar. Office area housed in lean-to at rear is 40' wide by 590' long.



Ideco Bowstring Roof Hangar in use by Braniff International Airways at Wold-Chamberlain Field, Minneapolis, Minnesota, 180' wide by 130' deep. Electrically operated doors have 31'6" overhead clearance.



Ideco Gable-Roof Hangar in service at Knoxille Municipal Airport, Knoxville, Tennessee. 120' wide by 120' deep with 21'6" overhead clearance at door.

DRESSER IDECO

Aircraft Hangars

in a wide range of sizes and types for every purpose

Ideco standard steel hangars, in a variety of types and sizes are serving commercial and business aircraft operators throughout the Western Hemisphere. Standardized parts save architectural and engineering costs . . . offer speed and economy in erection. Layouts are planned to provide ready access to planes anywhere in the hangar. Ample space is provided for parts storage, tool rooms, office and lounge areas. Three basic styles, in a wide range of spans and heights, offer a variety of choice. Rolling leaf doors, either electrically or manually operated, open to the full hangar width, facilitate movement of aircraft in and out. And, just like Ideco steel buildings, Ideco hangars go up in a hurry . . . at minimum erection costs. Parts are *completely* shop fabricated, arrive at the job site ready for bolted assembly. No field welding, cutting, drilling, burning or riveting is necessary. Anchor bolt plans arrive before the steel so that foundations and floor slabs can be prepared in advance. Insulation (optional) provides year 'round comfort in any climate.

GUIDE TO IDECO HANGAR SIZES

(Subject to exact determination for each project)

Span (in feet)	Maximum Overhead Clearance (in feet)	Hangar Type
40	16	Gable
60	16	Gable or Bowstring
70	16	
80	20	
90	20	
100	24	
120	30	
130	36	
150	36	
160	35	Bowstring or Arch
180	36	
180-300	40	Arch

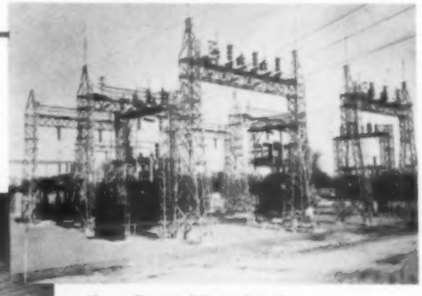
LENGTHS — All types and sizes available in any lengths in increments of two feet.

STANDARD LOADS — Wind load 20 lbs./ft.^{2} on vertical surfaces and vertical projection of the roof. Live load of 20, 30 or 40 lbs./ft.^{2} plus dead load on horizontally projected roof area. Special designs for heavier loads are available.

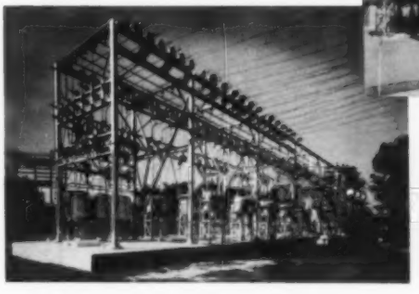
CLEAR DOOR OPENINGS are slightly less than the spans and the maximum overhead clearances shown in table.

Electric Power Stations

Custom built substations to suit the power distribution needs of utilities or manufacturing and processing plants are another Dresser-Ideco specialty in steel. All parts are completely shop fabricated to close tolerances to insure accuracy of fit and alignment. And, all parts are Hot-Dip galvanized after fabrication for long-lasting rust prevention. Experienced Dresser-Ideco designers work to your specifications, design the most efficient structure for your electrical layouts.



Above, Dresser-Ideco substation designed and built for U.S. Steel's Fairless Works at Morristown, New Jersey.



At the left, a typical Dresser-Ideco low voltage utility substation.

A

B

C

D

DRESSER
IDECO

DRESSER-IDECO COMPANY

875 MICHIGAN AVENUE
COLUMBUS 8, OHIO

One of the Dresser Industries

Sales agents
in principal cities of the U.S.A.
and Eastern Canada

A *This "candelabra" TV tower is the only one of its kind in the world . . . supports twin antennas on a top platform at 1521 feet.*

B *Guyed tower, for TV use, supports five ton, eighty foot tall VHF antenna at 978 feet.*

C *Self-supporting TV tower, requires no guy cables, can be erected on small plot, on building roof or in rough, uneven terrain.*

D *Microwave and radio towers, either guyed or self-supporting (like this one) are available in heights up through 600 feet.*

Ideco Towers—

tall or short...
for TV,
Microwave,
AM, FM

For broadcast antenna towers of all heights, station operators depend on Ideco experience and reliable, unerring Ideco engineering ability.

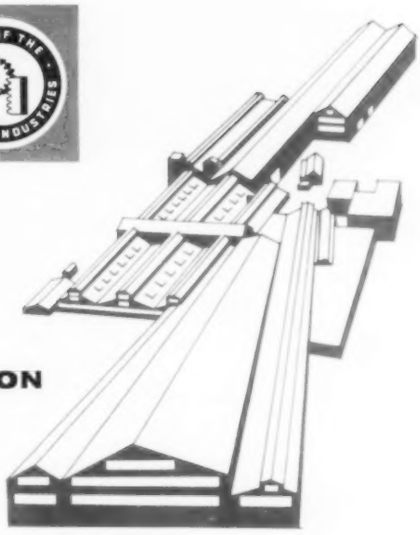
You, *too*, can depend on Ideco regardless of your tower height requirement. From foundation to top beacon, each Ideco tower is designed and built to ride out the roughest storms and most punishing climatic conditions. Time proved *triangular* design, pioneered by Ideco, insures a "true" structure free from indeterminate stresses... substantially reduces weight and the number of structural members requiring maintenance . . . offers least wind resistance. Hot-dip galvanizing of *every* part, *after* fabrication, prevents rust.

For careful attention to every detail of planning, design and construction by tower engineers with an unparalleled record of experience, specify Ideco towers. Write for complete information.

Radar Towers

Radar towers, like these Ideco structures designed for use in North America's DEW line aircraft warning network, are typical of the specialized steel structures which Dresser-Ideco designs and builds for government and industry. The arctic radar tower at the left, fifty feet in diameter and fifty feet in height, supports a scanning antenna on the top platform, houses electronic equipment beneath. The other structure performs same functions, is designed for temperate regions.

DRESSER
MANUFACTURING
DIVISION



DRESSER MANUFACTURING DIVISION
BRADFORD, PA.

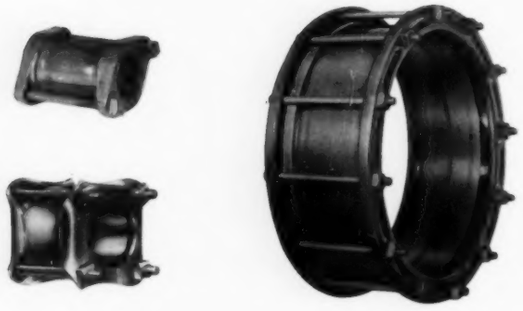
Dresser Manufacturing Division, founded in 1880, is the world's oldest and largest fabricator of rubber-packed pipe couplings. So successful was the original Dresser Coupling, designed to provide the first rugged, reliable, leakproof joint for piping of natural gas, that it quickly became, and has remained standard with gas utilities in virtually every city in the United States. Later Dresser Couplings found wide use for joining pipe in the oil industry, in water supply and distribution systems and in many applications in industrial piping. Today, they are used for joining all kinds of piping in sewage and filtration plants; on pumps, blowers, boilers, furnaces, locomotives and other machinery; on hydraulic, fuel, air pneumatic, low pressure steam, vacuum, chemical and many other types of lines; in oil refineries; and on farms, in homes, mines, on railroad engines and cars, for plumbing and heating and other piping. In fact, wherever pipe is joined, Dresser Couplings are used. Over half-a-million miles of pipe throughout the world have been joined with Dresser Couplings.

Recently Dresser Manufacturing Division has supplied couplings for the construction of many hydroelectric projects and water lines in Burma, Brazil, Israel, Venezuela, Canada, Alaska, Peru, Belgian Congo, India, Chile and other countries. Some of the Dresser Couplings used on these jobs approached 20′ in diameter and were specially designed to solve difficult construction problems. The Dresser Compression Seal which safely absorbs vibration, expansion-contraction movements and removes strain from the piping system, plus extremely easy installation, offers significant cost advantages over other types of large water line construction.

The Dresser Manufacturing Division plant is equipped with the most modern machinery for turning out standard products or special pipe joining and repair devices. Dresser engineers, backed by over 60 years of specialization in the pipeline field, have developed an exclusive, high quality line of pipe joints and fittings to meet every requirement.

Precision manufacture is provided by electronically operated machinery such as this 800 KVA welder.

DRESSER
MANUFACTURING DIVISION



STYLE 38

Dresser Style 38 Steel Couplings are the most widely used of all mechanical pipe joints. Manufactured and sold since 1891, they have proved their economy, reliability and superior utility both in common and unusual applications on natural gas, manufactured gas, water, oil, gasoline, sewage, chemical, air, steam, vacuum and other pipelines.

The Dresser Coupling consists of one cylindrical steel middle ring, two steel follower rings, two resilient gaskets of special Dresser Compound and a set of high strength steel track-head bolts. The middle ring has a conical flare at each end to receive the wedge portion of the gaskets. The follower rings confine the outer ends of the gaskets. Tightening the bolts draws the follower rings toward each other, compressing the gaskets in the space formed by follower rings, middle ring flares and pipe surface, effecting a flexible, leakproof seal.

Rugged and serviceable, Dresser Couplings will fit virtually any pipe or tubing having the same OD as steel or cast iron pipe-steel, cast iron, wrought iron, lead, asbestos cement, concrete, copper, brass, tile etc. Couplings can be furnished for practically any size or any special condition.

ADVANTAGES

Permanently Leakproof – The first Dresser-Coupled line, laid in 1891 is still giving efficient, maintenance-free service as are the more than half-a-million miles of Dresser-Coupled piping.

Flexible – Resilient Dresser gasket "floats" pipe, enabling piping to absorb all normal and many abnormal stresses, strains and movement without leakage. Couplings allow expansion contraction up to ⅜" per joint. They also permit deflections up to 4 degrees or more, permitting curves to be laid with straight pipe lengths.

Simple – Extreme simplicity in design of Dresser Couplings assures joints which assemble quickly, easily

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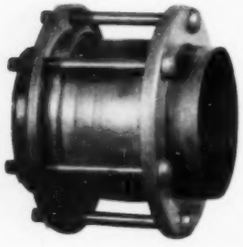
STYLE 39



Dresser Style 39 Insulating Couplings are widely used not only on gas, oil and water lines, but for tank hookups, on intake and discharge lines, at pumping stations which are electrically isolated, at river crossings, on bridge lines, between dissimilar metals, e.g., when joining steel pipe and copper tubing and many other uses.

The Style 39 follows the same basic design as the Dresser Style 38 Coupling but has insulating properties. The insulating gaskets extend under the follower rings and effectively insulate them from the pipe. In addition, the polyethylene gasket or skirt extends over the pipe end. This insulates the pipe from the middle ring of the coupling and prevents any possibility of current flow along the pipe. Style 39 Insulating Couplings are available in sizes ½" to 20" OD and larger. Details and prices are available on request.

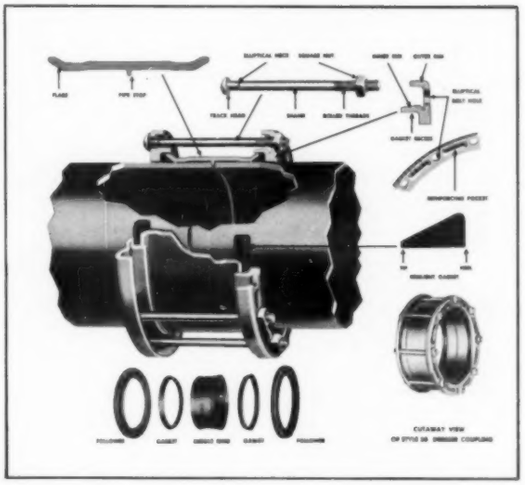
Form No. 3-53

STYLE 40

Dresser Style 40 Long Couplings provide a simple and effective method of joining pipe when gaps between pipe ends are wider than ordinary. They greatly simplify tie-ins, closures, settings and cut-ins by eliminating exact pipe fitting and bridging the gap; they provide ample length, plus protection, where pipe goes through thick walls; they supply a flexible joint of extra length where some sudden disturbance such as excessive settling or cave-ins might cause pipe to spring apart; they serve as repair sleeve on broken or split lines that have parted.

Style 40 Long Couplings differ from Style 38 Couplings in that (1) Coupling bodies have larger belly diameter to facilitate installation where angularity may be encountered, (2) bodies and bolts are longer. Otherwise, they have Style 38 construction, flexibility, tightness and other advantages. Though longer, they absorb the same amount of expansion and contraction, ⅜" per joint. Style 40 Long Couplings are available in types ½" to 24" OD and larger. Details and prices available on request.

Form No. 513R



and accurately. Inexperienced workmen can rapidly make leakproof joints every time. Only tool required is a wrench. Joining time averages two minutes per bolt.

Economical – The true economy of Dresser Couplings lies in the substantial savings their use makes possible. They save installation time, prevent leakage losses, and virtually eliminate maintenance expense. Their flexibility protects expensive valves and fittings. Coupling parts are reusable if line is moved.

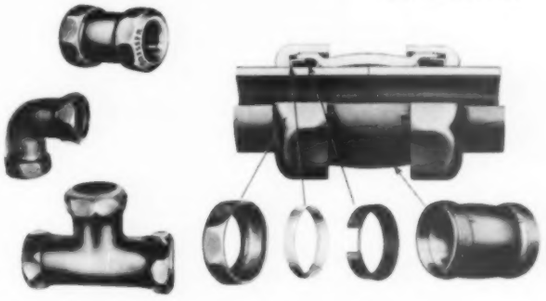
COMPRESSION FITTINGS

Dresser Compression fittings offer the simplest possible means for joining small diameter pipe. They are used on air; brine; propane-butane; creosote oil or tar; gas, by-product; gas, manufactured; gas, natural; gasoline; oil; refrigerants; sewage; low pressure steam; water and other type lines wherever found – on machinery, original equipment, water and sewage works etc.

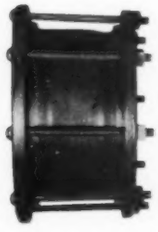
Dresser fittings consist of two threaded end-nuts, two gaskets, two gasket retainers and the fitting body. The threaded end-nuts screwing on the threaded body, compress the gasket to make a flexible, bottle-tight seal. The only tool required for installation is a wrench.

Dresser fittings are available in all shapes and sizes from ⅜" to 2". Details and prices available on request.

Form No. 505R



STYLE 62



Dresser Style 62 Reducing Couplings quickly join pipe of different outside diameter and can be furnished for connections between any two kinds or sizes of pipe. They can be used when (1) joining steel and cast-iron pipe, (2) when changing the class of pipe, (3) when making actual reductions in pipe size. Style 62 Couplings are typical Dresser joints – metal parts are steel; gaskets are specially compounded; installation is very easy and the resulting seal is flexible and bottle-tight.

Style 62 Reducing Couplings are available in 4 sizes – *Type 1*, for small reductions in pipe diameter. Standard Style 38 parts are used, except that middle ring is swaged at one end: *Type 2*, for larger reductions outside range of Type 1. Style 38 parts are used; *Type 3*, similar to Type 1 but made from Style 40 parts to span longer gaps between pipe ends; *Type 4*, similar to Type 2 but using Style 40 parts.

Couplings will be furnished for concentric reduction unless otherwise specified. Eccentric and Style 39-62 Insulating Reducing Couplings furnished to special order.

Style 62 Reducing Couplings available in size 2" to 24" ID and larger. Details and prices available on request.

Form No. 513-R

STYLE 91

Dresser Style 91 Service Saddles provide a quicker, more efficient way to make service connections off steel, cast-iron or asbestos-cement pipe. Easily installed, Dresser Saddles are ruggedly constructed of malleable iron with flat straps of high tensile steel. The straps conform snugly to the outside of the pipe and have a broad bearing on the pipe surfaces to prevent cutting or crushing of pipe. Specially-compounded Dresser gaskets are securely cemented in place.

Dresser Saddles are available in single and double strap sizes from 1" to 12" ID. Details and prices on request.

Form No. 954

STYLE 63

Dresser Style 63 Expansion Joints afford a less expensive method of absorbing concentrated expansion and contraction movements on gas, oil, water, gasoline, low-pressure steam and other piping.

Style 63 Expansion Joints are available in 4 types – *Type 1* is a single-end expansion joint, permitting 10" of pipe movement; *Type 2* is a double-end expansion joint, each pipe being free to move in and out a distance of 4"; *Types 3 & 4* are respectively the single and double-end type equipped with a limited movement feature.

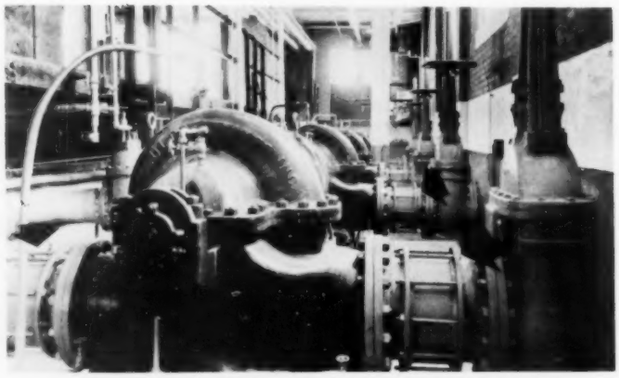
Dresser Expansion Joints are available in sizes 3" to 24" ID and larger. Details and prices available on request.

Form No. 5010

DRESSER
MANUFACTURING DIVISION

Dresser Long Sleeves are widely employed for tank connections and many other oil applications because they absorb settlement stresses, eliminate exact pipe fitting and alignment, provide positive, fast sealing.

This Peruvian penstock used flexible Dresser Couplings to eliminate expansion joints. These couplings also permit penstocks to follow the terrain with a minimum of grading.



Pumps, blowers, and other machinery are connected with flexible Dresser Couplings to absorb the vibration stresses and to provide easier takedown for repairs.

Dresser Manufacturing Division

HOME OFFICE & FACTORY: Bradford, Penna.

One of the Dresser Industries

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Chicago, Denver, South San Francisco

EXPORT OFFICE
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CANADA

Dresser Manufacturing Co., Ltd.
1211 Bathurst Street, Toronto 4, Ontario
1210 11th Avenue W., Calgary, Alberta

OVERSEAS

Sales & Service

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General Representative:
Dresser International, Inc.

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Mauricio Hochschild y Cia Ltda
Casilla 153-D, Santiago

COLOMBIA
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Apartado Aereo No. 4083, Bogota
Walter Bridge & Co., Ltd.
Apartado Aereo 649, Medellin

ECUADOR
Harold T. Smith, Inc., P.O. Box 630, Quito

HONDURAS
Casa Comercial Mathews S. A.
Apartado Postal 39, Tegucigalpa, D. C.

MEXICO
Cia Mfra de Tubos de Acero S. A.
Apartado 809, Monterrey

PUERTO RICO
Luis F. Caratini & Son
Apartado 2184, San Juan

VENEZUELA
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Colon a Dr. Diaz No. 23
Apartado No. 3974, Caracas

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General Representative: Dresser A. G.

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19 C. Battisti, Milan

ASIA
General Representative: Dresser A. G.

ARABIA
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P.O. Box 79, Kuwait

INDIA
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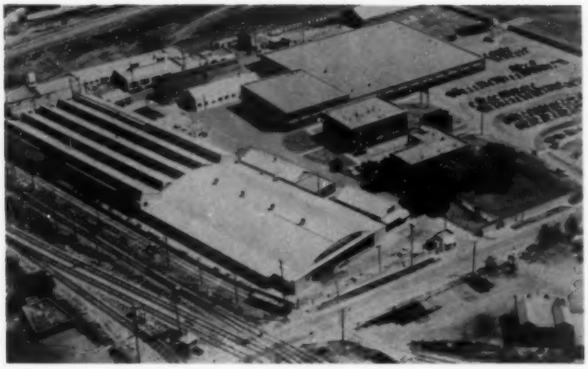
ISRAEL
Industrial & Engineering Enterprises Ltd.
6 Ahuzat Bayit Street, P.O.B. 1298, Tel-Aviv

Manufacturing

ENGLAND
Dresser Manufactures (England) Ltd.
39 Victoria Street, London, S.W.I.



DRILLING, PRODUCTION AND WORKOVER TOOLS

Manufactured by

The GUIBERSON Corporation

DALLAS, TEXAS

Sold By Leading Oil Field Supply Stores Everywhere

For more than a third of a century, Guiberson oil tools have been accepted as the standard of top quality in the field. The famous Guiberson "G" on a broad line of tools for production, drilling and workover and its familiar slogan "Better Be Safe Than Sorry" are regarded by crews the world over as symbols for dependability, long life and efficient service.

The company, founded in 1919, has fully developed a 20-acre manufacturing plant in Dallas where it was originally established. Significant in these facilities are a large modern rubber plant for compounding and pressure molding all types of oil field rubber products, plus a complete testing laboratory which simulates actual bottom hole conditions of depth, pressure and temperatures. A full complement of metal working machines and a heat treating plant, together with a special laboratory for compounding and reinforcing rubber and bonding it to steel, make Guiberson a completely modern, highly integrated manufacturing plant.

The progress and growth of Guiberson for the past seven years has been at an all-time high, well above the industry average. Acquired by Dresser in 1956, Guiberson has a full line of specialized oil field tools to round out and diversify the products of Dresser Industries.

Guiberson products are sold through all leading oil field supply stores, with warehouse stocks and representatives strategically located throughout the United States and most oil producing areas of the world. Export shipments are made from the Dallas manufacturing plants.

Temperature-controlled hydraulic presses in Guiberson's modern rubber plant mold precision, high-quality rubber products for oil field use. Guiberson also does custom molding for other manufacturers of oil field equipment and for oil service companies.

Guiberson
Swabs and Accessories

Guiberson designed and produced one of the first swabs for the oil industry, and for years the Guiberson swab has been the accepted leader in the oil producing countries of the world. This leadership in swab design and manufacture plus Guiberson's accumulated experience in combining rubber and steel have led Guiberson to further specialization in molded rubber products for oil field use.

The company manufactures a complete line of swabs and cups for all sizes of tubing, drill pipe and casing. Most of the cups are interchangeable and include many special sizes. There is a swab to meet every well condition. Guiberson swab cups incorporate a flexible lip, many with wire cage molded in, to give unequalled performance for lifting any load from shallow or deep wells. Guiberson specializes in the manufacture of swabs to solve difficult and unusual as well as routine swabbing problems. There is a continuous program of development on swabs and swab cups.

A full line of accessories is available: wire line oil savers with long-wearing rubbers; overload relief valves that prevent stuck swabs; sinker bars; tubular jars and many types of rope sockets.

Tubing Swab with Type J Cups

Casing Swab with Type GW Cups

Type R Wire Line Oil Saver

Type S Wire Line Oil Saver

Type U Wire Line Oil Saver

Guiberson Packers, Anchors and Accessories

Guiberson manufacturers a diversified line of packers to cover all uses in the field, designed and thoroughly tested to meet the various conditions encountered in producing oil at any depth, and in all parts of the world. The ruggedness of Guiberson packers enables them to withstand highest pressures and temperatures encountered in bottom hold pressure operations.

Included in Guiberson's line of packers are hookwall production packers, anchor packers, open-hole formation packers, water flood injection packers, hold down packers for testing, acidizing and formation pressuring operations. Dual tubing string packers and permanent completion drillable packers are two of Guiberson's most recently developed tools. All are available in a full range of sizes.

Special features of Guiberson packers are an automatic latch, or jay-hook latch; a choice of friction springs or pads; cup-type packers that automatically produce a tighter seal under increasing pressure; and packer rubbers that return to their natural shape, and will not vulcanize to the casing wall. These and other developments have earned Guiberson tools a reputation for outstanding performance.

A line of hydraulic and hook-wall anchors, tubing catchers, safety joints, valves and accessory items work with the entire line of packers. Notable among these tools is Guiberson's automatic-setting hydraulic hold down anchor, which is run on top of the packer for high pressure fracturing, acidizing and other down hole operations. Introduced less than four years ago, it is the most popular anchor in the field. It requires no tubing manipulation to set, has tremendous holding power and an unusually large by-pass area. Guiberson's tension type tubing anchor and its jay-slot anchor with friction springs are two other well-regarded tools in the line. All anchors are made in a full range of sizes.

Another Guiberson leader is its famous tubing catcher, standard for the industry. Guiberson's tubing catcher automatically stops tubing with a drop of less than three inches should the tubing string break and has proved its worth in thousands of wells all over the world.

Guiberson tubing safety joints give positive protection under any well condition. They release tubing string quickly, but only when operator is ready. These safety joints are produced in all sizes in both shear pin types and back-off types.

Type RD Retrievable Dual String Packer with Anchor

Type A Drillable Packer

Type GW Two-Cup Packer

Type A Intermitter-Regulator Controller

Type A Flow Valve

Type BC Motor Valve with Drip Chamber

Guiberson Lease Automation and Gas Lift Equipment

Guiberson has entered the relatively new field of lease automation with a line of motor valves and controllers, pneumatic or electrically operated, for tank switching and measuring. An exclusive controller development is the Guiberson timer drum for accurate, trouble-free setting and operation. Production by gas lift method uses the controller and other motor valves on the surface and a line of flow valves, check valves and mandrels in the well. The flow valves incorporate a unique Guiberson feature which allows production by continuous flow or intermitting with a simple surface adjustment. Guiberson makes a complete line of gas lift equipment.

Low Pressure Quick Change Wing Nut Union

High Pressure Seal-O-Matic Wing Nut Union

Guiberson Unions

Guiberson makes a full line of low pressure, quick-change unions for rigs, tank batteries and flow lines. Rugged, heavy-duty high pressure Seal-O-Matic unions are manufactured for high pressure use in truck manifolds and lines of all types. They serve well under the severest operating conditions, and are designed for fast make or break, minimum upkeep and positive seal within the pressure ratings. They are made in a wide range of sizes, hubs and pressure ratings.

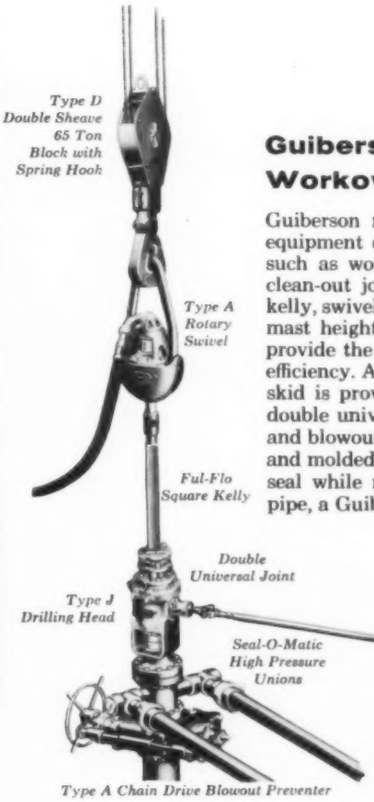
The Seal-O-Matic ring in the high pressure unions is Guiberson designed and Guiberson molded from a special oil resistant compound that does not deteriorate in oil, gas or under pressure. Guiberson's Seal-O-Matic unions are used in a wide variety of applications in drilling, workover and refining as well as in chemical plants.

Type L8 Control Head Hookwall Production Packer

Type KV8 Control Head Hookwall Production Packer

Type H4 Hydraulic Hold Down Anchor

Type A Tubing Safety Joint


Type D Double Sheave 65 Ton Block with Spring Hook
Type A Rotary Swivel
Ful-Flo Square Kelly
Double Universal Joint
Type J Drilling Head
Seal-O-Matic High Pressure Unions
Power Drive Unit

Type A Chain Drive Blowout Preventer

Guiberson Workover Surface Equipment

Guiberson manufactures a unitized matching line of equipment designed for portable rig and derrick work such as workovers, small hole drilling, acidizing and clean-out jobs. Each blowout preventer, drilling head, kelly, swivel and block with hook is designed to conserve mast height, to give easy access for servicing, and to provide the operator with greater safety and operating efficiency. A unitized power drive on a rigid light-weight skid is provided with hydraulic couplings, brake, and double universal joint to power the rig. Drilling heads and blowout preventers incorporate Guiberson designed and molded rubber sealing elements that give a positive seal while rotating. Swivel features piston-type washpipe, a Guiberson development.

Type JUS High Pressure Tubing Stripper

Type E Tubing Stripper

Type F Tubing Spider

Guiberson Tubing Spiders and Strippers

Guiberson manufactures a group of well head tools for running and pulling tubing and sucker rods. Included are high pressure, heavy duty adjustable tubing strippers with or without slips and bowl; a compact low pressure automatic tubing stripper with a reinforced, self-adjusting rubber; an adjustable sucker rod stripper, the top of which operates like a union nut for compressing the rubber.

Tubing spiders are made in heavy-duty, medium and light types for manual, semi-automatic or pneumatic operation. Guiberson slips and bowl are designed to prevent stuck slips. Guiberson's newest type tubing spider is an inexpensive, advance designed spider with a three-way grip that prevents rotation of tubing either way. Slips have individual teeth that are easily replaceable.

Drill Pipe Protector Rubber

Overlapping Type Tubing Protector Rubber

Interlocking Type Tubing Protector Rubber

Guiberson Drill Pipe and Tubing Protector Rubbers

One of the more recent developments to come out of the Guiberson Rubber Laboratory is a drill pipe protector rubber made of special oil resistant compounds. These protectors stay put and are made in a full range of sizes. Tubing rubbers are designed to protect the tubing joint opposite high pressure perforations. Formulated especially for oil field use, both types of protectors are non-swelling and resilient with high tensile strength and great resistance to high temperatures, abrasion, oil base mud and other well fluids.

Guiberson Precision-Molded Rubber Products

Guiberson has specialized for years in high-quality molded rubber products for oil field use. It has one of the largest and best equipped rubber plants in the Southwest plus a modern laboratory for quality control, experimental work and development in both natural and synthetic products. Controlled compounding with an unusual ability to bond rubber, metal and fabric enables Guiberson to produce precision rubber products of accurate size and uniformity–products that resist abrasion, oil, gas and well fluids and stand up under high pressures and temperatures.

Guiberson Custom Molded Rubber Products

The

GUIBERSON

Corporation

Dallas, Texas

One of the Dresser Industries

Foreign Operations Department
P.O. Box 1106
1000 Forest Avenue
Dallas, Texas
Cable Address: GUIBERSON

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K. W. Tipper
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Estevan
Saskatchewan, Canada

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VENEZUELA
M. W. Breedlove, Estado Anzoategui, Buena Vista
M. W. Breedlove, Estado Anzoategui, Las Parcelas De Anaco

EASTERN HEMISPHERE

ISRAEL
Makhtesh Mining and Quarry Equipment Co., Ltd., P.O. Box 1837, Tel-Aviv

ITALY
Rappresentanze Forniture Petrolifere S. r. l., Via S. Radegonda 8, Milano

IDECO®

A complete line of rotary drilling, workover and servicing equipment is produced at Ideco's modern, fully-equipped Beaumont, Texas, plant.

IDECO, Dallas, Texas

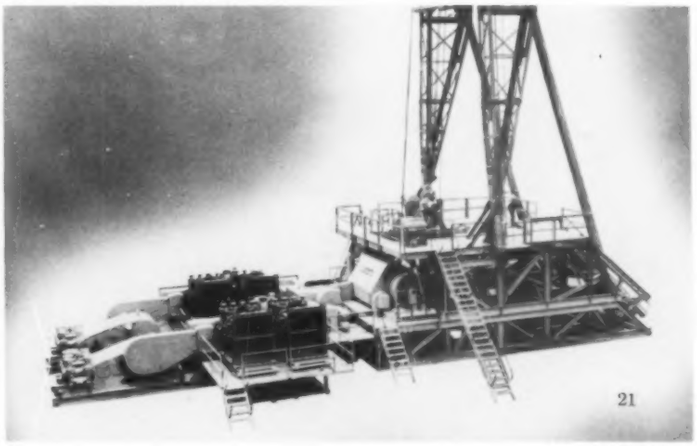
Ideco's recognized position in supplying equipment and supplies to the world-wide oil industry has been achieved through its widely-recognized "ONE-PACKAGE" EXPORT SERVICE. As a single source for every item, large or small, required in oilfield operations Ideco has many advantages to offer the export trade:

1. RESPONSIBILITY . . . is centered in one source, from original planning to actual operation of the equipment.
2. ECONOMY . . . in purchasing results from integrated engineering and properly prepared specifications. Costly duplications and omissions are avoided.
3. FASTER DELIVERY . . . of accessory items is made possible because of Ideco's regular large-volume buying practices, plus the tremendous purchasing power of Dresser Industries.
4. LOWER INLAND FREIGHT RATES . . . because of the ideal geographical location of our Beaumont plant in a seaport with seatrain and intracoastal canal service available.
5. TESTING . . . of the complete rig before shipping is accomplished at our Beaumont plant. This gives extra assurance of faster rig-up and maximum performance on location.
6. EXPORT PACKING AND SHIPPING . . . is an Ideco speciality.
7. SERVICE IN THE FIELD . . . is provided by Ideco on a world-wide basis through Ideco offices and agents in strategic and convenient locations. Complete follow-through to the location, training of crews, and reliable maintenance service has been of major importance in developing Ideco's favorable export position.

The Ideco name on oilwell drilling, workover and servicing equipment has represented advanced design and quality manufacture since the founding of the Beaumont plant in 1920. Here is centered the production of all Ideco equipment. A continued expansion program to keep pace with the increasing demand has supplemented the Beaumont facilities with associated manufacturers in the United States as well as licensed manufacturers in the Eastern Hemisphere. These include Woodfield Hoist and Associated Industries, Ltd. of Rochester, England; S.p.A. Nuovo Pignone, Florence, Italy and Batignolles-Chatillon, Paris, France.

Further broadening the scope of Ideco export operations are many outstanding lines of equipment which Ideco represents exclusively to the export trade. These include famous Deutz air-cooled and water-cooled diesel engines and Mayhew portable rotary drilling equipment.

For complete information on Ideco equipment and "ONE-PACKAGE" Export Service, write for the "Condensed Catalog" and Bulletin XP-54.

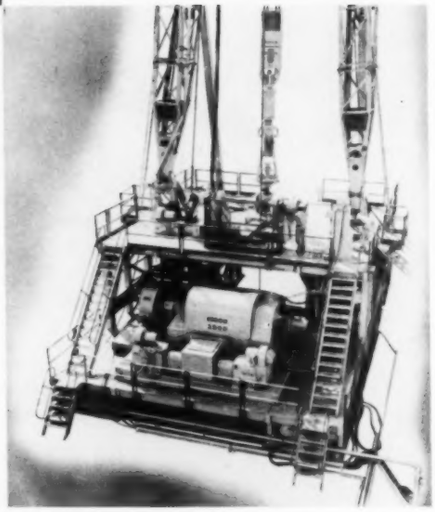


1350-S: This large rig typifies clean, integrated Ideco design. The drawworks is in a "submerged" position giving the working floor maximum open area. 2080 horsepower diesel engines drive through a compact twin compound. Mud pumps are 880 h.p. Ideco Triplex Flo-Masters. Mast is a 143-foot Ideco Full-View.

IDECO®

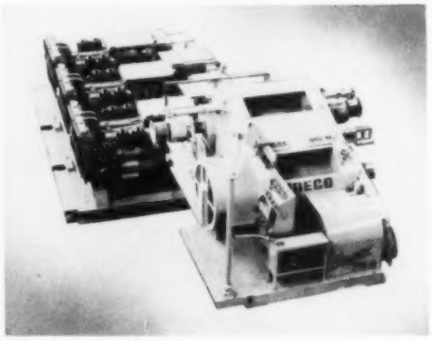
Drilling, Workover and Servicing Rigs

More than a dozen sizes of drilling, workover and servicing rigs in the Ideco line give the operator a wide selection of economical equipment for every depth and application. Ideco rigs are fast, smooth, and easy to operate with fingertip air controls and air clutches. Designed for maximum portability, they are mounted on trucks, trailers, barges or skids. Power transmission may be through torque converters, fluid couplings, or direct mechanical drive. For complete information on all Ideco products write for the "Condensed Catalog."



2500 SERIES

Designed for outstanding economy in the deepest drilling, these rigs have maximum flexibility and portability. The basic 2500 drawworks may be powered by electric motors or by internal combustion engines through torque converters, fluid couplings, or direct mechanical drive. Shown at right is the E-2500 with drawworks drive consisting of two 625 h.p. electric motors. Three unitized generator sets develop a total of 2625 horsepower.

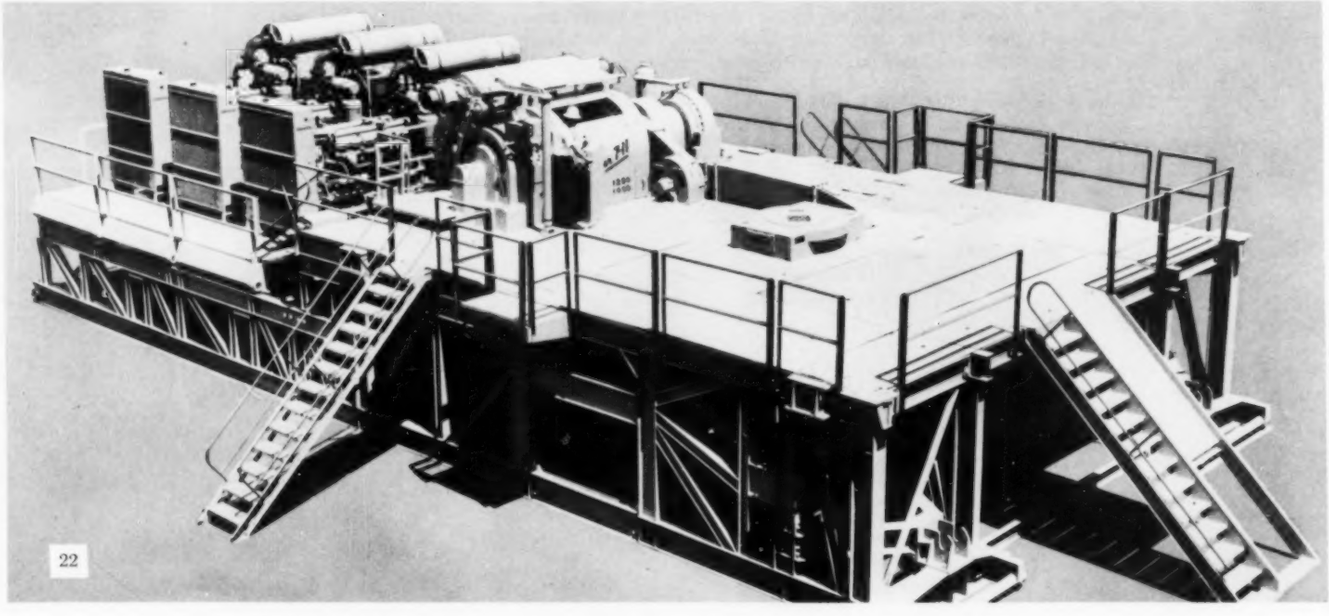


SUPER 750

Typical of Ideco's constant advance in the design of fast, smooth and flexible rigs is the new Super 750. Like all Ideco rigs it is completely air-controlled, rugged, and with high reserve capacity. The Super 750 is available in both Hydrair and Mechanical versions.

SUPER 7-11

Ideco's new Super 7-11, with up to 1450 input horsepower, has super portability, flexibility and economy. It is engineered for convenient roadsize packages, and may be equipped with torque converters, fluid couplings, or mechanical drive. Inline or sectional compounds accommodate two, three or four engines.



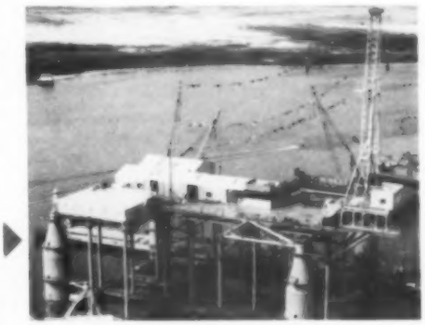
IDECO®

Full-View® and Kwik-Lift Masts

Ideco portable masts are familiar sights in oil country the world over. The famous Full-Views are available in heights up to 143-feet with hook-load capacities up to 750,000 pounds, gross capacities to 950,000 pounds. Wheel-mounted Kwik-Lift masts are available in 12 different models, internally guyed or externally guyed and in six different heights from 65 to 105 feet – hook capacities to 268,000 pounds.

FULL-VIEW MASTS

Outstanding portability in the field and over the ocean has made the Full-View a world favorite. The mast may be moved intact or in two or four-piece packages by separating bolted or pinned sections. This easy dismantling permits great reduction in ocean freight cubeage. On the job Full-Views offer exceptional stability, full visibility and unobstructed working floor.



TILTING FULL-VIEW

Versatility of the Full-View in offshore operations is shown here. The "Tilting" feature permits the mast to double as a giant crane for setting 110-ton production platforms with hook centerline 64 feet from base pedestals. A 30-foot leg spread allows the mast to withstand 130 m.p.h. winds with piperacks full. For hurricane conditions it can be lowered quickly.

Wheel-mounted Rambler Rigs

Available in four versions to provide high capacity and high mobility in servicing, workover and drilling. Ideco Ramblers combine hoist, engines and mast on trucks, single or dual semi-trailers, or self-propelled carriers.

DRIVE-IN RAMBLERS

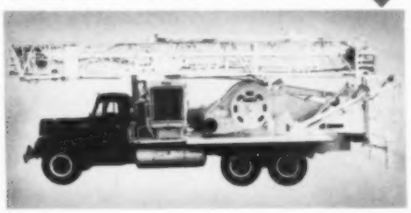
utilize the same engine for moving over the highway and operating the rig. When equipped with rotary drive and substructure, as in picture below, they are excellent for light drilling. Drive-In Ramblers with guyless masts have unmatched speed and mobility for servicing.

DUAL RAMBLERS

divide the weight of the rig by placing mast and substructure on one trailer and hoist and engines on another. These are joined rigidly over the wellsite. The mast requires no external guylines.

TRUCK RAMBLERS

may employ independent power units for rig operation or use the truck engine through a power take-off. Three drawworks are available, and 65, 89 or 95-foot Kwik-Lift masts.



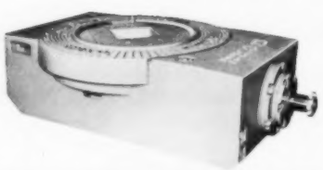
IDECO

IDECO

Post Office Box 1331 • Dallas 21, Texas

One of the Dresser Industries

WORLDWIDE REPRESENTATION AND SERVICE



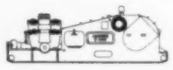
STREAMLINED ROTARIES

Ideco 100% oil-bath rotaries are available in 5 sizes and 9 models to meet every drilling requirement. Pinion shaft "capsule" assembly can be removed as a unit for easy servicing. Ideco Kelly Drive Bushings assure accurate reading of weight indicator, have top and bottom Neoprene grease retainers.

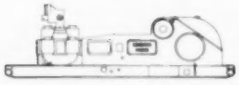
SHORTY BLOCKS
CROWN BLOCKS
STREAMLINED SWIVELS

Unitized Shorty Blocks combine block and hydraulically-cushioned hook assembly in one compact unit. Clevis-type Shorty Blocks are easily converted by adding hook assembly. Available in capacities from 100 to 480 tons. Patented plate steel Fabriform sheaves used throughout . . . Streamlined Swivels have exclusive, long-lasting "floating" washpipes, Kwik-Change washpipe packing cartridges, removable goose-neck cap. Available in capacities to 500 tons.

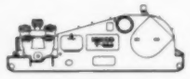
MUD-MASTER DUPLEX 600



FLO-MASTER TRIPLEX T-440



MUD-MASTER DUPLEX 1250



FLO-MASTER TRIPLEX T-880

DUPLEX AND TRIPLEX MUD PUMPS

600 h.p. Mud-Master Duplex and 880 h.p. Flo-Master Triplex mud pumps are all-steel for rugged strength and greater output per pound of weight. Fluid ends are normalized all-steel castings with high fluid efficiency. Watch for announcements of the big 8" x 18" 1250 h.p. duplex Mud-Master, ready soon.

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LANE WELLS COMPANY

ONE OF THE DRESSER INDUSTRIES

LANE-WELLS COMPANY

LOS ANGELES, CALIFORNIA

Packers • Bridging Plugs • Tubing Port Valves •
Hydraulic Hold Down Tools • Electric Logging •
Radioactivity Well Logging • Gun Perforating.

Although Lane-Wells Company is one of the newest members of the Dresser Industries, it has a history dating back to 1932. It was in this year that Lane-Wells brought the first Gun Perforating Unit to the world oil industry by perforating a California oil well, the first ever perforated.*

Interestingly enough, the weapon known in almost every language as the Bazooka, designed by war-time demands, was quickly converted to a beneficial oil industry tool. By taking the shaped charge principle of the bazooka, Lane-Wells incorporated it into a high intensity, deep penetrating, oil well perforating gun, known as Koneshot. The pencil-like gas jet stream generated by Koneshot is so intense that it travels at a velocity of 30,000 feet per second to deliver a 4.4 million p.s.i. impact on the formation. Penetration from 5-18 inches (depending on gun size) is tested, normal expectancy when fired through .350 inches of steel, J-55 or equivalent, backed up by 24 inches of 16.7 pound per gallon neat cement as homogeneous and free of air as possible and cured for 3 days at 70°F. Target material is confined.

In addition to Gun Perforating, this company pioneered in the field the first Radioactivity Well Logging Equipment, which was developed by Well Surveys, Incorporated. And today, after more than sixteen years of logging, Radioactivity Well Logging remains the only satisfactory method of obtaining stratigraphic information in cased holes and through tubing. The need for smaller instruments, to run in liners, small diameter casing and thru drill pipe, prompted the development of Lane-Wells 2⅝" and 1¾" OD instruments, the latter two of which will run in 2" tubing. With these new smaller diameter instruments, as with the standard instruments, Lane-Wells offers a simultaneously-run collar log.

The picture at the right shows the inside view of Lane-Wells small diameter Radioactivity Well Logging Truck. This equipment is used without a rig in permanent type well completion, called "Thru-Tubing."

Union Oil of California's La Merced #17, perforated December 12, 1932.

A Technical Oil Field Service Company

LANE WELLS COMPANY

LANE-WELLS *packers*

Lane-Wells gun perforating and radioactivity well logging

Sub-surface, downhole operations are Lane-Wells primary area of concentration. All the tools and services offered the Oil Industry by Lane-Wells are engineered for accuracy and simplicity, and have innumerable check and balance features to insure successful performance in the oil industry's key operational area—downhole.

Packers, Hydraulic Hold Down Tools, Tubing Port Valves, Bridging Plugs, and Skid Units presently are the major items Lane-Wells offers the oil industry on a world-wide basis. Other services, offered at this time only in the Western Hemisphere, are Electric Logging, Radioactivity Well Logging, and Bullet and Kone-shot perforating.

To insure positive downhole operations, many laboratory tested features have been incorporated in Lane-Wells packers. Two of these features are the Floseal Packing Rings and the Flopak Valve Seal.

The Floseal Packing Rings have been tested and proved highly successful in maintaining a pack-off in over 10,000 wells.

The Flopak Valve Seal was developed to solve the many difficulties usually encountered with valve type packers. Flopak Valve Seals are treated in the molding process to provide carefully tested flow characteristics so a positive seal is assured regardless of obstructions likely to lodge on the valve seat.

Almost 300 sizes in 12 types of packers are offered by Lane-Wells to the oil industry of the world. Basic descriptions and illustrations of the major types are given here and an application chart for both single packer and combination packer applications appears on following page. By combining the individual packer information with the application chart information, you can easily select the proper packer for your specific job.

BOC Packer
Valve, Hookwall Type

To obtain positive casing-to-tubing pack-off with a medium duty packer, ask for Lane-Wells BOC Packer. The BOC Packer runs with moderate speed in fluid and is applicable in any of the operations listed for the BOC at the end of this section. The by-pass makes possible easy running and pulling through fluid, and the circulating valve permits equalization of pressures before pulling.

BOCU Packer
Valve, Anchor Type

For the upper of a two-packer combination, Lane-Wells BOCU Packer can be used with any BOC, BOCL, BOE, BOEL or AO packer to pack off a limited section of casing. The BOCU by-pass and circulating valve offer the same versatility as on other packers in the BOC series. To prevent communication between tubing and annulus through the circulation ports, a sliding seal is incorporated between the lower end of the Mandrel and the circulating sub. Positive casing-to-tubing pack-off is obtained with the BOCU in the applications listed later in this section.

Series 3
Formation Packer
Valveless,
Anchor Type
(Sleeve Packing Element)

Where very low fluid heads prevail and a by-pass valve to circulate above the packer is not required, Lane-Wells Series 3 Formation Packer is recommended. This packer obtains an open hole-to-tubing pack-off in the applications listed at the end of this section.

CO Packer
Valveless,
Hookwall Type
(Thin Wall)

Where clearance between strings of pipe is at a minimum (as between tubing and casing, or between casing strings), use Lane-Wells CO Packers. These packers do not feature the by-pass or circulating valve but are excellent where a thin wall packer is needed. A smaller, thin wall packer—(tubing type COT)—is also available but not shown.

FEATURES: Departure from standard Lane-Wells design principles to permit hookwall action in limited space. CO applications appear later in this section.

Tubing Port Valve

The Tubing Port Valve is especially suited for displacing fluids in the annulus above a packer. When formation pressures are such that heavy fluids in the well cannot safely be displaced prior to setting a packer, a tubing port valve installation is recommended.

The tubing port valve also provides a means of acidizing two zones with a single packer setting. Three zone acidizing is practical with a single setting of a two packer set-up and two different sized tubing port valves.

BOCL Packer

Valve, Hookwall Type

For deep wells where tubing stretch is considerable, Lane-Wells BOCL Packer will obtain a positive casing-to-tubing pack-off. The BOCL is a 6-ring packer and will pack-off under any conditions of weight, temperature, and pressure. The by-pass allows easy running and pulling through fluids, and the circulating valve allows equalization of pressure and removal of settlings before pulling. BOCL applications appear at the end of this section.

BOE Packers

Valve, Hookwall Type
(Extra Heavy Duty Testing)

Severe operating and extreme well conditions are met with Lane-Wells BOE Packer. This packer is excellent for testing or short term repeat operations. The BOE or BOEL extra heavy duty packer obtains a positive casing-to-tubing or casing-to-drill pipe pack-off in the applications listed later in this section.

BOEL Packers

Valve, Hookwall Type
(Extra Heavy Duty Testing)

To meet severe operating and extreme well conditions in deep holes, select Lane-Wells BOEL Packer. The BOEL mandrel allows a 30" stroke between valve and seat to assure better valve control in deep wells.

AO Packer

Valveless, Hookwall Type

Application in dry casing is a major use for Lane-Wells AO Packer. The AO Packer is also excellent in fluid filled casing where slow running is practicable and a circulation valve not essential. Under either of these conditions, the AO will obtain a positive casing-to-tubing pack-off in the AO applications listed at the end of this section.

TOP

(Tension Operated Packer)

Where below packer pressures or lack of tubing weight make it impractical to use a conventional packer, Lane-Wells Tension Operated Packers best meet the requirement. The slips are set and the packing rings expanded by pulling tension on the tubing instead of applying weight on top of the packer. A Duo-Release Feature of the TOP allows rapid and easy removal even under adverse conditions. This packer is excellent in formation fracturing operations. The TOP is especially recommended for water flood injection.

BOCI Packer

Valve, Hookwall Type
(Inverted Setting, Tension Operated)

Where lack of tubing weight or extremely high below-packer pressures make it impractical to use a conventional packer, Lane-Wells BOCI Packers will obtain a positive casing-to-tubing pack-off by applying tension to the tubing. Safety features are built in for recovery in unusual situations.

Series 4 Formation Packer

Valve, Anchor Type
(Sleeve Packing Element)

Where the versatility of the by-pass in a fluid filled open hole is desirable, Lane-Wells Series 4 Formation Packer is recommended. The Series 4 Packer will obtain a pack-off between open hole and casing or drill pipe in the applications listed on the next page.

SD Packer

Valveless, Anchor Type
(Thin Wall)

When a large diameter running-in string is used and clearance between strings does not permit a BOCU Packer, ask for Lane-Wells SD (Anchor Type) Packer. The SD Packer offers a positive pack-off between casing and large diameter running-in string wherever an anchor type packer can be used. SD applications appear at the end of this section.

Hydraulic Hold Down Tool

For providing resistance to vertical movement of a packer when extremely high differential pressures are anticipated below the packer, the Lane-Wells Hydraulic Hold Down Tool is ideal. This tool has been tested to over 6,000 psi, differential, has non-porous nickel plated pistons and body, individual and specific holding points on the piston to afford a positive fix in the casing and is economical because of its simplicity of design. Tool operates entirely by hydraulic pressures built up in the mandrel at rear of pistons forcing the piston out into contact with the casing. The greater the pressure trying to move the packer in the casing, the greater the pressure on the pistons and resultant holding action.

Single Packer Application

Testing Single Zone Formation Content ..... BOC-BOCL-BOE-BOEL-AO-Series #3 & #4-TOP

Testing Cement Job or Casing for Leaks ..... BOC-BOCL-BOE-BOEL-AO-TOP

Acidizing Single and Dual Zones ..... BOC-BOCL-BOE-BOEL-AO-Series #3 (with Hydraulic Hold Down Tool)-TOP

Protecting Casing BOC-BOCL-AO-Series #3 & #4-CO-TOP

Improving Natural Flow Efficiency ..... BOC-BOCL-AO-Series #3 & #4-SD-TOP

Dual Zone Completion ..... BOC-TOP

Inducing Tubing Flow Using Side Door Chokes, Tubing Perforations or Gas Lift Valves ..... BOC-BOCL-AO-Series #3 & #4-SD-CO-TOP

Improving Volumetric Efficiency of Plunger Pumps, Blocking Casing Leaks, Separating Zones, Reducing Heading, Reducing Paraffin Accumulation in Pumping Wells ..... BOC-BOCL-AO-Series #3 & #4-CO-SD-TOP

Injection of Gas or Water Into Single Zones – For Repressuring, Recycling or Storage ..... BOC-BOCL-AO-CO-SD (with Hydraulic Hold Down Tool)-TOP

Shallow Wells ..... BOCI-TOP

Water Flood Operations ..... BOCI-TOP (with Hydraulic Hold Down Tool)-BOC-BOCL

Hydrafrac, Stratalift, and other Methods of Formation Fracturing ..... BOCI-TOP (with Hydraulic Hold-Down Tool)-BOC-BOCL

Improving Gas Oil Ratios in Open Hole ..... Series #3 & #4

Packing Off Water in Open Hole ..... Series #3 & #4

Combination Packer Application

Testing Multiple Zone Formation Content ..... BOCU or SD with BOC or BOE or AO or BOCL

Testing Cement or Casing for Leaks ..... BOCU or SD with BOC or BOE or AO

Acidizing Multiple Zones ..... BOCU or SD with BOC or BOE or AO (with Hydraulic Hold Down Tool)

Any Straddle Tool Application ..... BOCU or SD with BOC (with or without Hydraulic Hold Down Tool)

Perforation Washing ..... BOCU or SD with BOC or BOE or AO (with or without Hydraulic Hold Down Tool)

Selective Injection of Gas or Water Into Multiple Zones for Repressuring, Recycling, Pressure Maintenance, or Storage ..... CO with BOCU and BOC or CO with AO and SD

Infinite variation in perforation density is afforded by the selective firing features of the Lane-Wells bullet perforators. Pictured at the right, is the selectivity fired E-Gun.

LANE WELLS COMPANY

Lane-Wells Company

General Offices
5610 So. Soto St., Los Angeles 58, California
One of the Dresser Industries

For further information concerning Lane-Wells Equipment and Services, write the listed representative closest to you or cable Wellslane, Los Angeles, California, U.S.A.

CANADA

Lane-Wells Canadian Company
P.O. Box 4020
South Edmonton, Alberta, Canada

OVERSEAS

LATIN AMERICA
General Representative:
Dresser International, Inc.

ARGENTINA
Adrian Bolland y Cia S.R.L.
Avenida Pte. R. Saenz Pena 832
Buenos Aires

BRAZIL
Maquip, Caixa Postal 2508
Rio de Janeiro

ECUADOR & PERU
International Gas Lift S. A.
Talara, Peru

MEXICO
G. Saavedra y Hijos S. de R.L.
Ave. Morelos 31
Mexico City 1, D.F.

TRINIDAD, BARBADOS & BRITISH WEST INDIES
Trinidad Oilfield Service Co., Ltd.
Cross Crossing, San Fernando, Trinidad

VENEZUELA
Petro Tech Service C.A.
Apartado 2728, Caracas

EUROPE
General Representative: Dresser A.G.

GERMANY
Fagro, G.m.b.H., Erwinstrasse 8
Hannover, Germany

TURKEY
Hamamcioglu Muesseseleri Tivaret T.A.S.
P.O. Box 2020
Istanbul

ASIA
General Representative: Dresser A.G.

JAPAN
Boswell International Inc.
427 Sanshin Bldg. 1-10 Yurako-ku, Tokyo

THAILAND
International Engineering Co. Ltd.
P.O. Box 39
Chartered Bank Lane, Bangkok

AUSTRALIA, NEW ZEALAND & THE PHILLIPINES
General Representative: Dresser A.G.

SYDNEY
J. G. Antliff
c/o Oil Drilling & Exploration, Ltd.
126 Phillips Street

Magcobar
Complete
DRILLING MUD SERVICE

MAGNET COVE BARIUM CORPORATION

HOUSTON, TEXAS

Deeper wells . . . oil industry progress – those two terms have become synonymous. And, as in every other giant size business, oil progress requires continuous improvements in techniques and tools of the trade.

Drilling mud is one of those vital tools.

Its function is a major concern to oil operators as wells penetrate ever deeper in the search for oil. The multitude of problems encountered in reaching those greater producing depths is a challenge that requires more than mere trial and error drilling mud mixtures.

It is a challenge that tests the ability of mud scientists to increase the speed, efficiency and safety of oil well operations.

Magcobar is meeting that challenge daily by providing not only a full line of quality drilling mud materials and chemicals, but a complete drilling mud service as well . . . a service that meets every conceivable drilling mud requirement. Magcobar service includes modern laboratories staffed with skilled engineers and technicians for product development and quality control, capable field engineers with laboratory equipped automobiles to assist the driller at his rig, and an aggressive dealer organization offering prompt day and night mud supply from more than 450 locations in all active areas.

An example of Magcobar's faith in its past record . . . and to keep ahead of oil industry advancements . . . is the construction of the new Houston testing, research and development laboratory and offices. Its completion means more adequate facilities for the advanced study of circulation fluid problems which will result in still further oil industry progress.

Magcobar's research laboratories have developed such outstanding products as the world's first 30 lb./gal. mud and have perfected other drilling materials such as water-in-oil emulsions. Here, research engineers work night and day to solve drilling mud problems for today and for the future. This continuous research program is one of the reasons that Magcobar products and service are known and used wherever you drill for oil.

Magcobar®

Magcobar, the company that has been built on good service, highest quality products and fair and reasonable prices, provides the oil industry with the most complete line of drilling mud products and chemicals. Whatever your drilling mud problem, there is a specialized Magcobar product that will help you drill safely and more economically.

It takes a complete team to keep dependable drilling mud service available, and the mud engineer is the member of the Magcobar team who gives accurate laboratory analysis of mud at the well.

WEIGHTING MATERIALS

MAGCOBAR is barium sulfate especially prepared for use as a weighting material for oil well drilling mud.

G-7 is a super weighting material for preparing extremely heavy muds for emergency use.

CLAYS

MAGCOGEL BENTONITE is made from carefully selected high gel type, colloidal bentonite, a naturally occurring product found only in Wyoming.

HIGH YIELD DRILLING MUD is a ready mixed mud in dry form. Muds made from High Yield Drilling Mud are resistant to salt and other contaminants.

SALT GEL is a colloidal clay for use in salt water.

XACT CLAY is a low yield type of clay. Even though it is a low yield type, it has an exceptionally good particle size distribution.

THINNERS OR DISPERSING AGENTS

Q-X QUEBRACHO, a superior unadulterated organic dispersant, is used for stabilizing and thinning drilling muds.

TANNATHIN is an organic mud thinner and conditioner.

MAGNET COVE QUEBRACHO is a powerful dispersing agent and acts as a protective colloid for clay solids.

MAGCOPHOS, a neutral complex phosphate, is a powerful deflocculating and conditioning agent for drilling mud.

KEMBREAK is a refined calcium lignosulfonate for treating drilling mud to reduce its viscosity and gel strengths.

ALKATAN is a dry, ready mixed mud conditioner equivalent to equal parts of caustic soda and quebracho for controlling the viscosity, gel strength, and water loss of drilling muds.

EMULSITE is primarily a mud conditioner for the preparation and stabilization of oil-emulsion muds.

MAN-KEM is a reliable, low-cost tannin dispersant effective in lowering viscosity, gel strengths, and fluid loss.

DMS is a non-ionic *surfactant* which provides excellent chemical and *thermal* stability in surfactant muds.

T-8 is a mud prepared using T-8 compound as the conversion and primary maintenance chemical which inhibits shale

In the extensive mud engineer training program which Magcobar conducts regularly for its own personnel and those of oil companies, the student learns all that modern science knows about how to apply drilling mud knowledge to help oil operators drill better wells safely at lower costs.

The oil industry now uses most of the world's production of barite. Oil wells are drilled more safely and more economically today with modern drilling muds, such as supplied by Magnet Cove.

hydration and provides greater hole stability and uniform mud properties.

MAGCOTAN is a blended organic dispersant.

FLUID-LOSS-CONTROL AGENTS

MY-LO-JEL is an improved pre-gelatinized drilling mud starch in the form of a free-flowing powder which can be added directly to the mud through a hopper mixer.

DRISCOSE is a special sodium carboxymethyl cellulose in the form of white, free-flowing powder manufactured for use in drilling mud.

CYPAN is a synthetic organic mud additive used primarily for the control of filtration properties of drilling muds.

LOST-CIRCULATION MATERIALS

MUD FIBER is a special blend of cane fibers and wood fibers which provides a relatively short fiber product for sealing porous formations.

FIBER-SEAL is an improved fibrous mixture for preventing and stopping loss of circulation while drilling.

CELL-O-SEAL is an especially prepared cellophane in flake form. The variety of sizes of these cellophane flakes makes this material very effective in plugging porous formations.

LEATHER-FLOC is a fibrous material prepared from leather. Leather-Floc swells in water to form a thin, pliable, impervious mat over porous zones which resist even the passage of clear water.

MAGCO-FIBER is a free flowing blend of correctly sized Douglas fir fibers and flakes designed to give maximum bridging and sealing characteristics.

MAGCO-MICA are thin flakes of muscovite mica which have been carefully sized for use as a lost circulation material in drilling mud.

TUF-PLUG is a granular lost circulation material made from walnut shells graded for maximum sealing efficiency and optimum pumpability in all drilling fluids.

FORMAPLUG is a time setting clay cement. Mixed with water it forms a slurry having the physical properties of a highly thixotropic drilling fluid which can be pumped down the drill pipe and squeezed into fractured loss zones. Upon standing for a predetermined time, the FormAplug slurry thickens to a rubbery solid.

The Malvern, Arkansas, barite processing plant of Magcobar is one of several strategically located Magcobar mills where barite is processed for quick delivery to drilling locations throughout the world.

Magcobar®

BRIDGE BAG is a long, cylindrical canvas bag containing limestone for dropping into the hole and plugging large cavernous formation openings.

OIL MUD AND EMULSION MUD PRODUCTS

JEL-OIL MUD is a ready mixed, straight oil mud that meets all of the requirements of a non-aqueous drilling mud.

DRILLING MILK is a non-ionic emulsifier which creates and maintains an oil film on bearings and drill pipe thus providing corrosion protection while acting as an excellent oil-in-water emulsifier.

NO-BLOK is a brownish colored, free-flowing concentrate which forms an invert (water-in-oil) emulsion mud when mixed in the proper proportions with oil and water. The resulting emulsion has many of the advantages of oil base mud.

SPEEDY-DRILL, a blended chemical-type o/w emulsifier, is a product that is more compatible with mud than other oil emulsifiers and has less tendency to give foaming problems.

DME is a surfactant oil emulsifier for DMS muds.

MISCELLANEOUS MUD CHEMICALS & PRODUCTS

LUBE-KOTE is a specially prepared drilling mud graphite which improves the lubricating properties of mud and coats metal surfaces to resist wear and corrosion.

MY-LO-JEL PRESERVATIVE is a free-flowing powder blend of powerful bactericides to prevent fermentation of starch in low pH mud systems.

MAGCONOL is a defoamer in the higher alcohol class. It is very effective in combating foam in salt water muds.

MAGCO-DEFOAMER is a defoaming chemical containing an organic silicone compound.

E-150 is a defoamer of the fatty acid type. It is used in muds having a pH above 10.5, lime muds, and salt water muds.

At the Magnet Cove barite deposit in Arkansas, Magcobar operates the only underground mining facilities in the Western Hemisphere to produce barite for the oil industry.

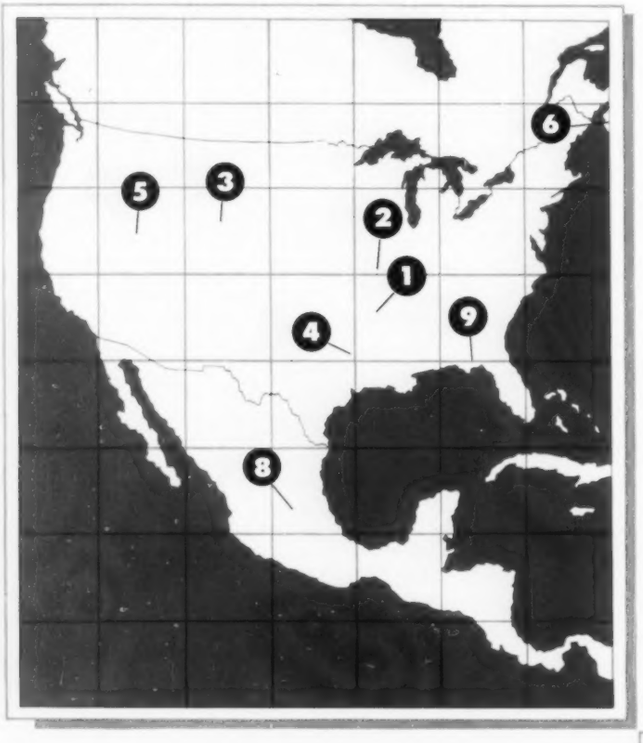
Magcobar
Complete
DRILLING MUD SERVICE

MAGNET COVE BARIUM CORPORATION

Post Office Box 6504
Houston 5, Texas

One of the Dresser Industries

Magcobar Offices, Service Engineers and Dealers are located in all oil fields throughout the U. S. and Canada



OVERSEAS SALES AND SERVICE

CUBA:
Compania Quimico Comercial de Cuba, S.A.;
Apartado 3151, Oficios 452, Havana

MEXICO:
Cia de Comercio Exterior, S.A.,
Balderas 44, Desps. 601, Mexico City 1, D.F.

Magcobar de Mexico, S.A.
Apartado 1742
Monterrey, N.L. Mexico

VENEZUELA:
Dresser Limited, C.A.
Edificio Villa Blance
Sur 17 Este 8
Caracas, Venezuela

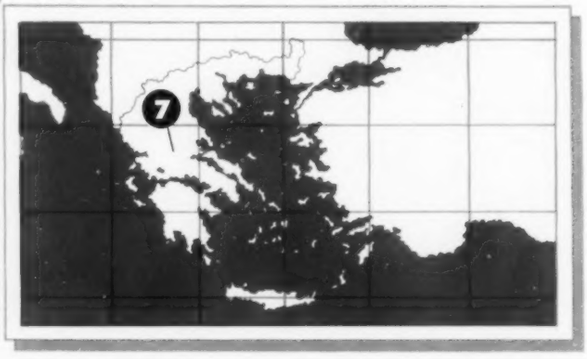
MILLS IN U.S.A. & CANADA

Arkansas, Malvern (barite)
Florida, Hinson (clay)
Louisiana, Lake Charles (barite)
Louisiana, New Orleans (barite)
Nevada, Battle Mountain (barite)
Nova Scotia, Walton (barite)
Texas, Brownsville (barite)
Texas, Zavalla (clay)
Wyoming, Greybull (bentonite)

MINES IN U.S.A. & OVERSEAS

Arkansas, Magnet Cove, 1
Florida, Hinson, 9
Greece, 7
Mexico, 8
Missouri, Potosi, 2
Nevada, Battle Mountain, 5
Novia Scotia, 6
Texas, Zavalla, 4
Wyoming, Greybull, 3

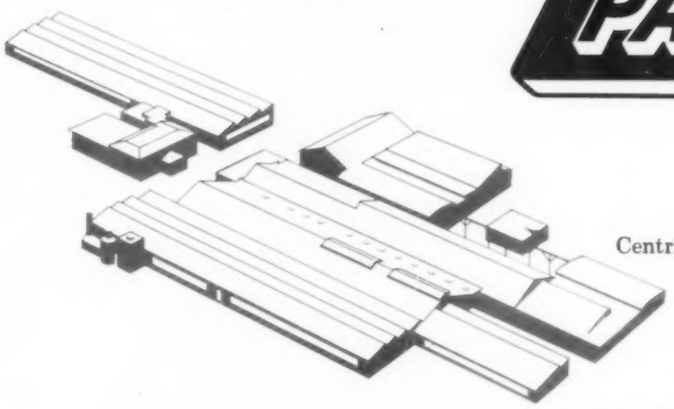
Numbers indicate location on maps.



A PRODUCER
OF BARITE
FOR DRILLING MUDS

The name to remember is

PACIFIC®



Centrifugal Pumps for Petroleum Refineries,
Chemical Plants, Utilities
and Marine Service

Plunger Pumps for Oil Wells

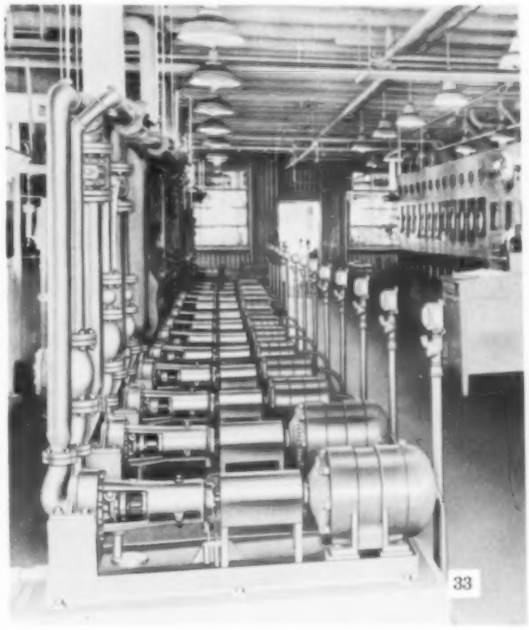
PACIFIC PUMPS, INC.

HUNTINGTON PARK, CALIFORNIA

Pacific Pumps, Inc. has been one of the leading manufacturers of centrifugal pumping equipment since 1923, supplying quality centrifugal pumps to refineries, chemical plants and similar installations throughout the world. To better serve its customers outside of the United States and to supply Pacific-designed pumps in currencies other than dollars, some years ago Pacific established manufacturing arrangements with three outstanding European companies.

Pulsometer in Reading, England, Batignolles-Chatillon in Paris, and Stork in Hengelo, Netherlands—can supply superior centrifugal pumps incorporating the Pacific standards of design, construction and performance. Transactions through these long-established and well-equipped firms may be carried out in Pounds Sterling, French Francs, Dutch Guilders, and other European currencies. In addition to the convenience of European exchange, these firms can and will offer prompt and efficient service whenever it is required. Staffed by experienced engineers and workmen, each of these organizations can furnish engineering and manufacturing assistance with minimum delay.

For more information concerning Pacific Centrifugal Pumps, write to Pacific Pumps, Inc., Huntington Park, California, U.S.A., or to any of the licensed manufacturers or sales representatives listed on Page 36. Bulletins describing and illustrating each of the various types will be sent to you promptly.



These Pacific centrifugal pumps in refinery service are typical of the thousands of Pacific process pumps in operation at petroleum refineries, natural gasoline plants, petrochemical plants and similar processing installations throughout the world.

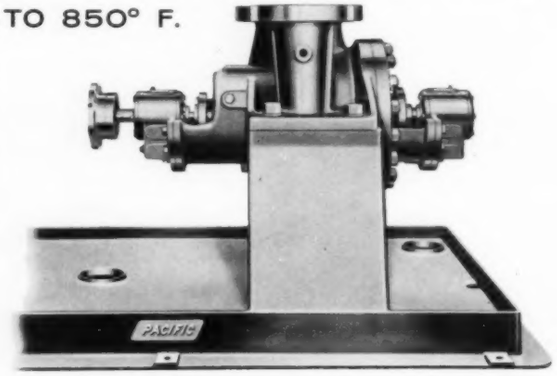
PACIFIC®

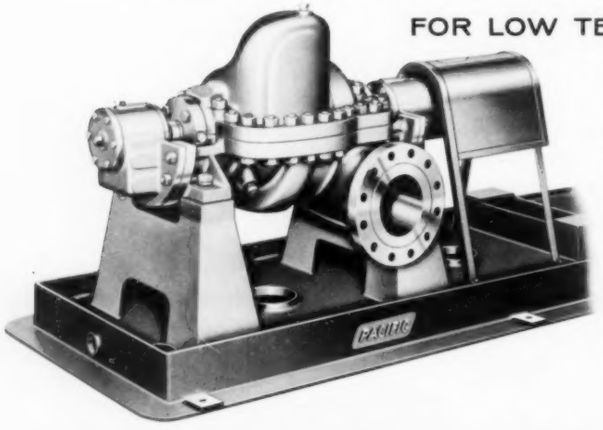
HORIZONTAL CENTRIFUGAL PUMPS FOR PROCESS SERVICE

Developed primarily for continuous process service in petroleum refineries, natural gasoline plants, chemical and other process industries, Pacific horizontal single- and multi-stage process pumps have been designed for pumping hot or cold hydrocarbons, chemicals, chemical solutions, acids, condensates and similar liquids.

FOR HIGH TEMPERATURE SERVICE–TO 850° F.

TYPE	NO. OF STAGES	CAPACITY USGPM	DIFF. PRESS. PSIG	DIFF. HEAD FEET
SVC	Single	To 3200	To 600	To 600
HVC	Single	To 4500	To 600	To 1000
RVC	Two	To 600	To 600	To 900
AC	Multi-	To 2500	To 1000	To 2600
OV	Multi-	To 1800	To 450	To 1500
UNI	Multi-	To 200	To 1500	To 3200



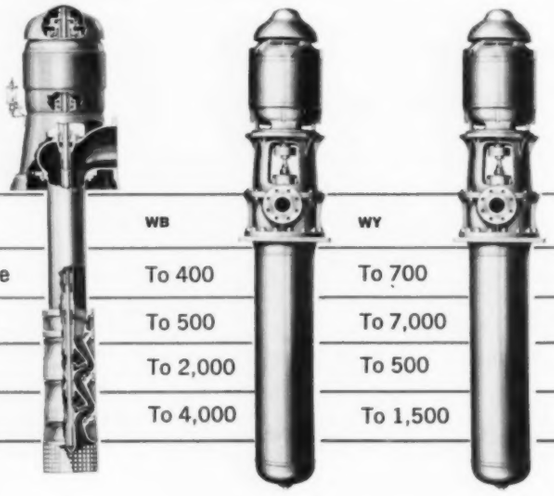


FOR LOW TEMPERATURE SERVICE–TO 300° F.

TYPE	NO. OF STAGES	CAPACITY USGPM	DIFF. PRESS. PSIG	DIFF. HEAD FEET
SVA	Single	To 1000	To 600	To 600
SVS	Single	To 1300	To 600	To 650
SVE	Single	To 800	To 300	To 300
RHC	Two	To 3000	To 700	To 1300
JC	Multi-	To 1600	To 850	To 2500
JO	Multi-	To 1300	To 1000	To 2800

SINGLE AND MULTI-STAGE VERTICAL CENTRIFUGAL PUMPS

Particularly suitable for – but not restricted to – installations where either the net positive suction head (NPSH) or the floor space is limited, Pacific vertical pumps are especially applicable for cooling tower, loading, booster, injection and similar services.



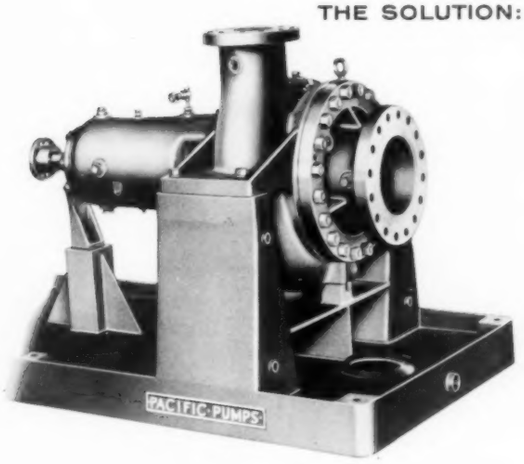
TYPE	CT	WB	WY
TEMPERATURE °F.	Cold Service	To 400	To 700
CAPACITY USGPM	To 25,000	To 500	To 7,000
DIFF. PRESS. PSIG	To 250	To 2,000	To 500
DIFF. HEAD FEET	To 260	To 4,000	To 1,500

HORIZONTAL SINGLE-STAGE SLURRY PUMPS

PACIFIC®

THE PROBLEM: To pump efficiently a liquid carrying abrasive material in suspension.

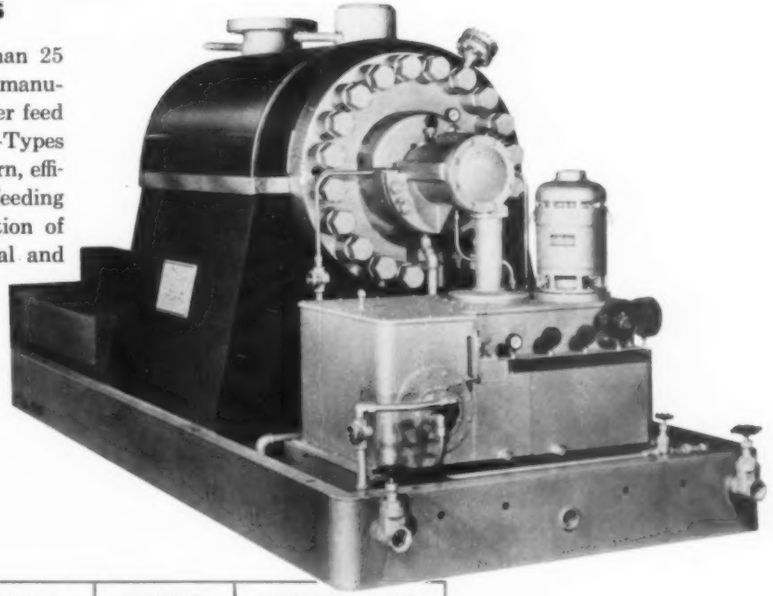
THE SOLUTION: Pacific Slurry Pumps—Types SV, SVC and HV. Designed especially to provide the rotating parts with the protection necessary for long operating life, combined with sustained efficiency and low maintenance costs.



TYPE	TEMP. °F.	CAPACITY USGPM	DIFF. PRESS. PSIG	DIFF. HEAD FEET
SV SLURRY	To 800	To 5000	To 600	To 600
SVC SLURRY	To 800	To 3000	To 600	To 600
HV SLURRY	To 800	To 3500	To 600	To 600

BOILER FEED PUMPS

Based on the knowledge of more than 25 years of experience in the design and manufacture of centrifugal pumps for boiler feed service, Pacific Boiler Feed Pumps—Types BFI, BFA and BFJB—provide modern, efficient and dependable service in the feeding of steam generators for the production of electrical energy in utility, municipal and industrial power stations.



TYPE	CAPACITY USGPM	TEMPERATURE OF	PRESSURE PSIG	DIFFERENTIAL HEAD FEET
BFI	100 to 4000	All	To 3500	To 8500
BFA	100 to 2700	Feedwater	To 1500	To 4500
BFJB	100 to 1000	Temperatures	To 1000	To 2800

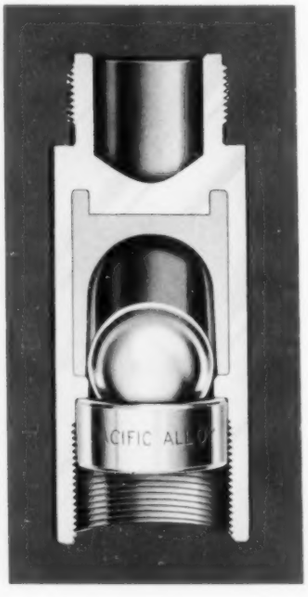
PACIFIC®

PLUNGER PUMPS
FOR OIL WELL SERVICE

Pacific Plunger Pumps for oil well service are designed and manufactured with the same skill and quality that characterize Pacific Centrifugal Pumps.

Molybdenum-alloy "MOLOY" liners, "PACILITE" plungers and the Pacific ball valve cage, fitted with a flexible and resilient ball guide, are but three of the special features of Pacific Plunger Pumps that provide long service life, together with efficient and economical operation. For more information about Pacific Plunger Pumps and illustrated Bulletin No. 123, write to:

Pacific Pumps, Inc., Post Office Box 151
Huntington Park, California, U.S.A.



PACIFIC PUMPS INC.

Huntington Park, California

One of the Dresser Industries

OFFICES WITHIN THE UNITED STATES

CALIFORNIA: 5715 Bickett Street, Huntington Park
593 Market Street, San Francisco 5
ILLINOIS: 79 West Monroe Street, Chicago
NEW YORK: 122 East 42nd Street, New York 17
OHIO: 4500 Euclid Avenue, Cleveland 3
OKLAHOMA: 1221 East First Street, Tulsa 20
PENNSYLVANIA: 1612 Market Street, Philadelphia 3
TEXAS: 1619 Ovid Street, Houston 10
EXPORT OFFICE: 122 East 42nd Street, New York 17, New York
Sales Representatives in Principal Cities Throughout the Country

CANADA

Pacific Pumps of Canada Limited, P.O. Box 275, Edmonton, Alberta

OVERSEAS

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LATIN AMERICA

General Representative: Dresser International, Inc.

COLOMBIA: Dr. Alberto Vargas M., Apartado Aereo 6353, Bogota
MEXICO (Centrifugal Pumps): Ingenieria de Procesos, Puebla 194, Mexico, D.F.
MEXICO (Oil Well Plunger Pumps): G. Saavedra e Hijos, S. de R.L. Avenida Morelos #31, Mexico, D.F.
PUERTO RICO: Badrena & Perez, Inc., Ponce de Leon 656, Apartado 596, Hato Rey
VENEZUELA: Equipex, S.A., Edificio Galipan, Apartado 4607 Este, Caracas
BRAZIL: H. Boccaccio, 81 Rio Branco, Rio de Janeiro
PERU: International Gas Lift, Apartado 71, Talara
TRINIDAD: Industrial Agencies, Ltd., 14 High Street, San Fernando

EUROPE

General Representative: Dresser A. G.

ITALY: SORATTE, Societa Rappresentanze Tecniche, a.r.l. Via Boldetti, 27, Rome
SPAIN: Suministros "SHAG", S.A., Av. Menendez Pelayo 2, Madrid
YUGOSLAVIA: Merkantile Foreign Agencies, Inozemna Zastupstva, Praska Ul. 2, P.O. Box 23, Zagreb
TURKEY: Hamamcioglu Muesseseleri Ticaret, T.A.S. Beyoglu P.O. Box 2020, Istanbul

ASIA

General Representative: Dresser A. G.

JAPAN (Marine Turbopumps): The Nissho Company, Nissho Building, 30 Imabashi 3-Chome, Higashi-Ku, Osaka
JAPAN (U.O.P. Refinery Pumps): Japan Gasoline Co., Mitsui Building, No. 1 2-Chome, Muromachi Nihonbashi, Chuo-Ku Tokyo

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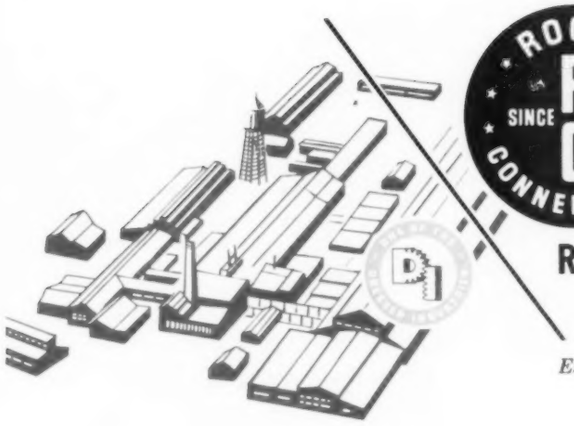
Manufacturing

FRANCE: Batignolles-Chatillon, 5 Rue de Monttessuy, Paris 7e
THE NETHERLANDS: Koninklijke Machinefabriek Gebr. Stork & Co. N.V. Hengelo (O)
UNITED KINGDOM: The Pulsometer Engineering Co., Ltd. Nine Elms Iron Works, Reading



In its second century
of experience
in moving gas and air...

ROOTS-CONNERSVILLE BLOWER DIVISION

CONNERSVILLE, INDIANA

Established 1854 *One of the Dresser Industries since 1944*

For more than a century, the Roots-Connersville Blower Division has been serving industry throughout the world. During this period, the Company has firmly established its reputation as a leading manufacturer of blowers, gas pumps, meters and vacuum pumps and has gained matchless experience in wide application of its products to the solution of gas and air handling problems.

Starting in 1854 with the basic invention of the "Roots" Rotary Positive principle for blowers, Roots-Connersville has expanded both its operations and product lines so that today it offers the most versatile services in the world for moving and controlling the flow of gas and air.

Roots-Connersville offers the only dual choice of either Rotary Positive or Centrifugal Blowers to meet specific or out-of-the-ordinary requirements.

Gas Pumps and Exhausters are available also in both Rotary Positive and Centrifugal designs.

Vacuum Pumps, of the same long-proved positive displacement design, provide new economies for a wide variety of applications particularly in the chemical, public works, aircraft and paper industries.

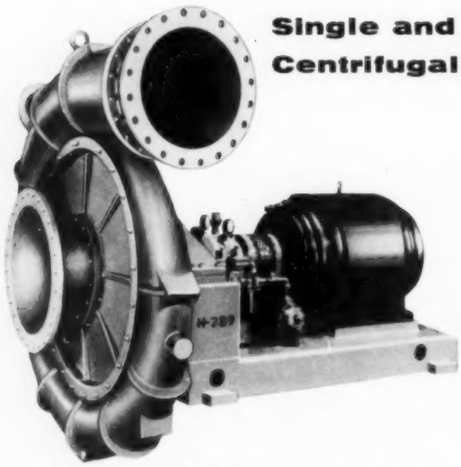
Meters with "cash register accuracy" combine the important advantages of small space requirements with thorough-going reliability for long years of service.

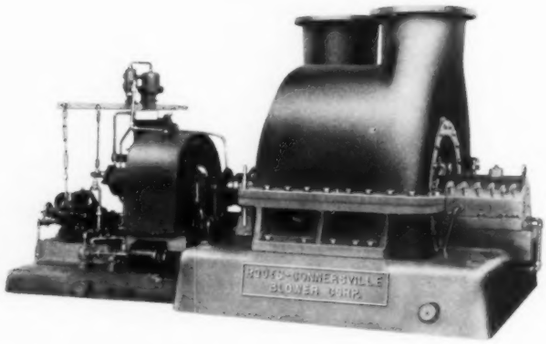
Spiraxial® Compressors, the most recent Roots-Connersville development, provide extremely high operating efficiencies at low operating cost within their application range.

In short, wherever there is work to do in moving gas or air for industrial processing, Roots-Connersville alone has the experience and ability to deliver versatility, flexibility, low first cost, operating and maintenance economy throughout its full line of equipment.

Four R-C multi-stage centrifugal gas boosters installed in a Milan, Italy gas works. Each booster is rated 720,000 cfh at 10 psig.

Single and Multi-Stage Centrifugal Blowers and Exhausters



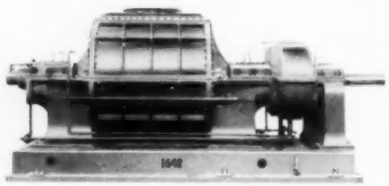


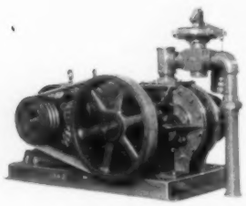
Single-stage units of the OI type have the impeller mounted on extended motor shaft. In the OIB type, it is mounted on its own shaft supported by pedestal bearings.

Multi-stage units, of the H type, are single inlet machines designed to meet specific conditions. The capacities of each type range from 2000 cfm to 100,000 cfm and more, at the highest practical pressures.

Applications – pumping natural gas; handling vapors in oil refineries; in producer and manufactured gas plants; chemical, pharmaceutical and explosive manufacturing; furnaces, cupolas and converters; coke by-product gases; sewage treatment plants.

Rotary Positive Gas Pumps

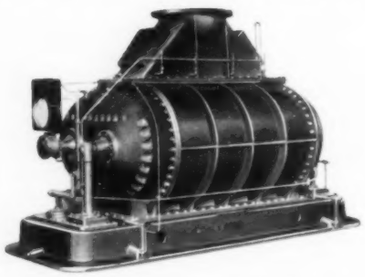




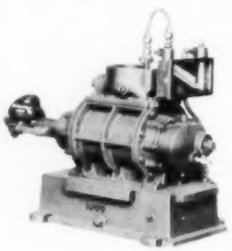
R-C positive displacement pumps maintain constant volume of gas with each revolution to assure accurate control at outlet or inlet as required in many applications. Capacities range from 5 cfm to 50,000 cfm at moderate pressures in the smaller sizes, up to 15 lbs. differential in larger units.

Applications – boosting pressure to gas-fired industrial burners; gathering natural gas from oil wells; moving gases and vapors in chemical, oil and pharmaceutical processing.

Positive Displacement Meters

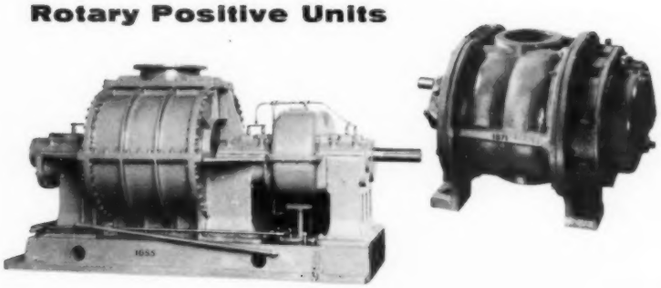


R-C positive displacement meters have no small parts, assuring long-time efficiency in any capacity from 2500 cfh to 1,000,000 cfh. Small space requirements reduce installation costs over other types while practically no operating or maintenance costs are encountered with R-C meters.



Applications—measuring air and gases in process industries; metering sold or purchased gas and for departmental accounting in industrial processes; station and district meters in gas manufacturing distribution.

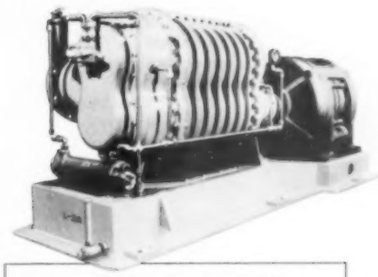
Rotary Positive Units

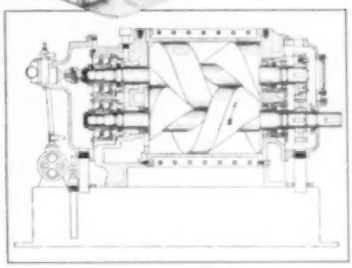


All R-C Blowers work equally well under suction or pressure or both, being designed on the "Roots" principle which has proved completely effective since 1854. Displacement per revolution is fixed to assure accurate control with constant or variable speed drive which can be of any modern type. Capacities range from 5 cfm to 50,000 cfm.

Applications – similar to Centrifugal units in larger sizes. In the smaller sizes, for combustion air; pneumatic conveying; drying and cleaning processes; supercharging and scavenging diesel engines; industrial processes.

Spiraxial® Compressors

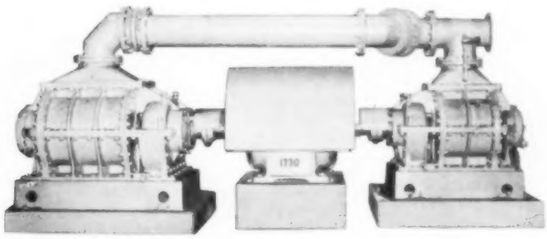




Internal compression Spiraxial Compressors have screw rotors and operate at much higher efficiencies than ordinary types. Capacities range from 700 cfm to 5000 cfm at pressures from 15 psi to 30 psi and higher. Within range of their applications, they have proved unusually economical.

Applications—oil refinery service; wax-processing; testing aeronautical and other equipment; various other uses where intermediate pressures are required.

Positive Displacement Vacuum Pumps



FOR PAPER MILL SERVICE

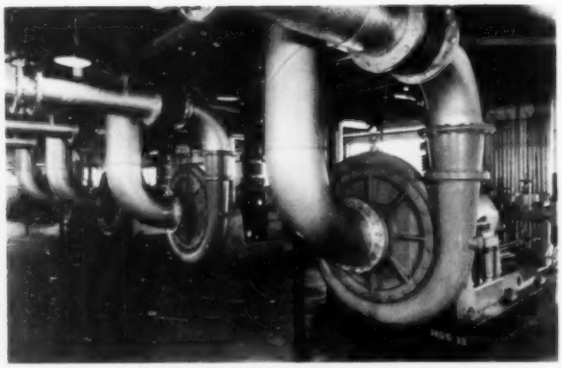
The improvements in design and efficiency in the R-C Vacuum Pump (single stage and compound) are so numerous and important that it has gained ready acceptance for the rigorous service to which modern paper mill equipment is subjected. Included among the improvements are roller bearings readily accessible; gears and bearings fully protected from damage by water; improved lubrication system; precision steel gears for quiet operation. Higher operating speeds permit direct connection to standard motors with resultant savings in power consumption.

Applications – couch rolls, drum rolls, press rolls, flat boxes, felt conditioners, etc. in paper mills.

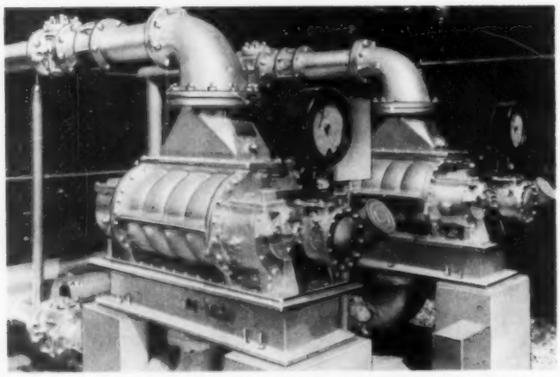
FOR GENERAL INDUSTRIAL SERVICE

R-C Vacuum Pumps are available in a wide range of sizes for producing vacuums up to 26″ Hg. Single stage units can be supplied for capacities from 500 cfm to 13,000 cfm at vacuums up to 20″ Hg. Compound units are recommended for highest efficiency from 15″ Hg. to 26″ Hg. vacuum, when handling capacities of 2,000 cfm to 15,000 cfm. Some features of these pumps assuring long life, superior performance and economical operation are high volumetric efficiences, low mechanical friction and flexibility. Every R-C Vacuum Pump is the product of fine engineering, quality materials, expert craftsmanship and modern production methods.

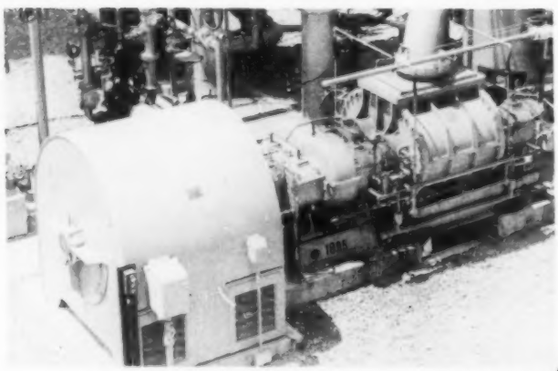
Applications—priming centrifugal pumps, vacuums for filters, exhausting oil vapors, high altitude test facilities, various uses in process industries.



Installation of four OIB Centrifugal Blowers at Cabot Carbon Company, Franklin, La. This is one of several Roots-Connersville installations by this company. Capacity of each unit is 10,330 cfm.

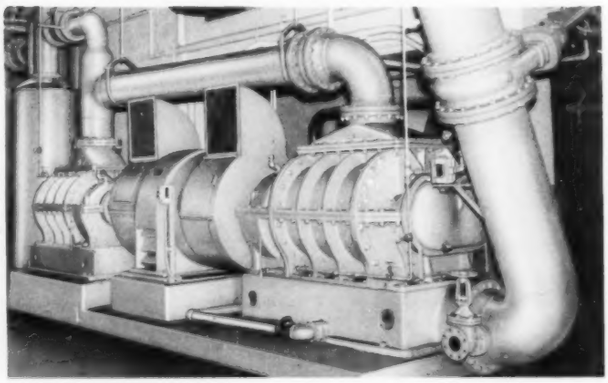


Outdoor meter installation for Knoxville Utilities Board measuring gas to an industrial user. Capacity of each meter is 60,000 cfh. Equipped with gear boxes, volume and pressure gauges.



Battery of two RCKH Gas Pumps at Mississippi Chemical Corporation, Yazoo City, Miss. Capacity of each pump is 8,660 cfm of .321 specific gravity gas.

Seven single-stage and compound R-C Positive-Displacement Vacuum Pumps installed in the Crown-Zellerbach Corporation's St. Helens mill for the world's largest Yankee tissue machine. Total capacity is 33,000 cfm at 10 to 20-inches Hg vacuum.



ROOTS-CONNERSVILLE BLOWER DIVISION

Connersville, Indiana

One of the Dresser Industries

'Round-the-world services to handle gas and air.

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629 Adelaide St. West, Toronto 3, Ontario

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W. C. Holmes & Co. Ltd., Huddersfield, England

Security

SECURITY ENGINEERING DIVISION

Dallas, Texas · Whittier, California

SECURITY ROCK BITS LTD.

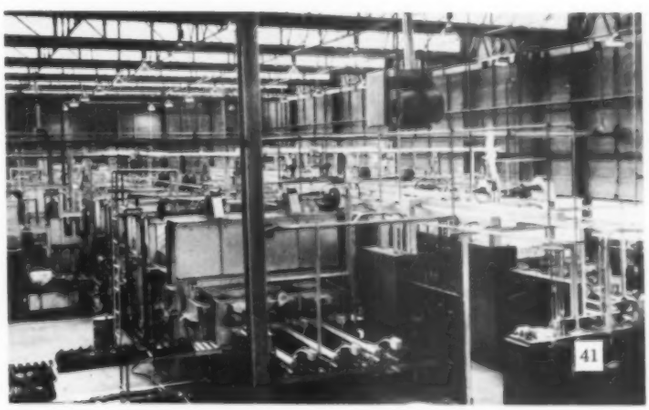
Manchester, England

An unbroken record of quality products has placed Security in the forefront as a manufacturer of subsurface equipment used by the oil and gas industries in the drilling of wells. Since its founding in 1931 and affiliation with Dresser in 1945, Security has expanded steadily. It now operates the world's newest, most modern facilities for manufacturing rock bits, hole openers, casing scrapers, rubber stabilizers, reamers and allied products.

In 1956, Security Rock Bits, Ltd., Manchester, England started production. This modern manufacturing plant greatly increases the supply of Security rock bits to all parts of the world where oil is found.

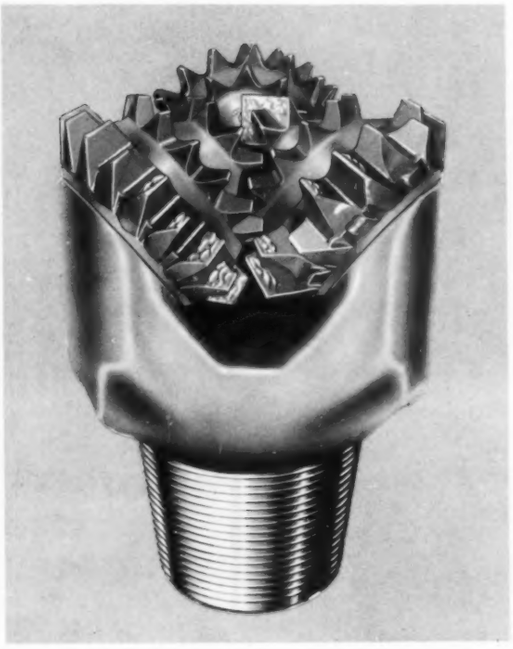
Security's line of three-cutter rock bits assures maximum cutting speeds in all types of formations. They are manufactured to meet the oil industry's ever-increasing need for more rugged and dependable tools.

Security's growth to second in the production and sale of rock bits is due to its continuous policy of providing the world's oil industry with a truly integrated service. A close relationship between manufacturing, engineering, sales and the customer assures that Security, now and in the future, will continue to meet the most exacting requirements of drilling and production techniques.

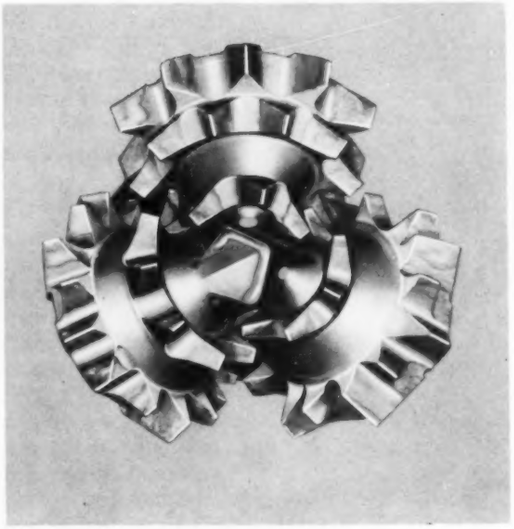


Typical of Security's advanced manufacturing methods is this new, *continuous* head treating facility at the Dallas plant. The automatic carburizing and hardening equipment are products of years of planning by Security metallurgists; and are designed to produce rock bit parts to Security's unique specifications.

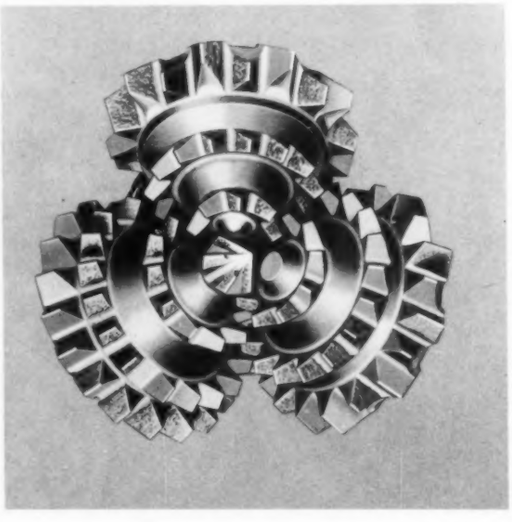
Security



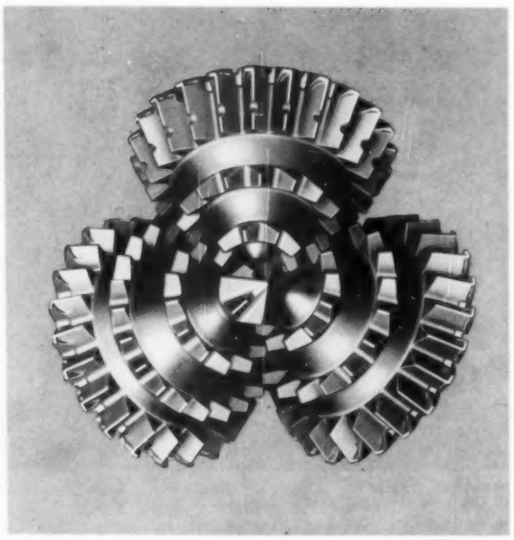
The smooth-running, free-cutting characteristics of Security 3-cutter Rock Bits are due to cutter construction, tooth arrangement, and full clearance between bit body and side of hole. Spaced and notched for maximum penetration, interfitting cutter teeth are self-cleaning; bottom of hole is kept cleaner to let all cutting surfaces work freely and efficiently. Balanced ball and roller bearings assure proper distribution of thrust and radial loads, eliminating excess friction, and providing ample strength for toughest drilling. Bodies are forged steel. Cutters are special heat-treated steel, hard-faced for extra footage and longer life. In choice of standard or jet models.



SOFT FORMATION BITS ("S" Series) are offered in several types to meet conditions ranging from soft, sticky shales and clays to medium shales, gypsum, salt, chalk, anhydrite, medium hard limestone and broken or semi-consolidated formations. The S-3 (illustrated) has long, deeply-cut, widely-spaced teeth to give twisting-tearing action for maximum penetration; plus an efficient flushing system that eliminates balling-up in soft, sticky formation. Other soft formation types feature specifically designed cutters to fit specific drilling conditions.

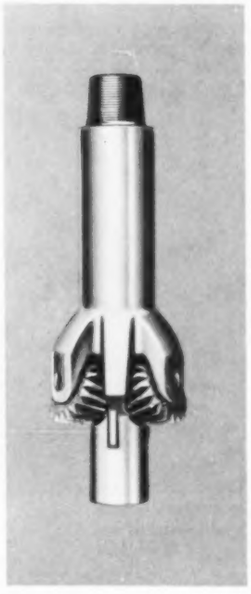


MEDIUM FORMATION BITS ("M" Series) are manufactured in a number of variations for rock types ranging from sands, medium shales, anhydrite, medium hard limestones, shaley lime, and other broken formations to hard lime, hard shale, hard sand, dolomite, slate, and hard anhydrite. "M" series teeth are less widely-spaced and less deeply cut than "S" series. The "M-4" combines twisting-tearing cutting action for softer formations with chipping-crushing action for harder formations. The "M-5", has cutter teeth providing chipping-crushing action with gouging action. Teeth, hard-faced with tungsten carbide, maintain a sharp cutting edge.



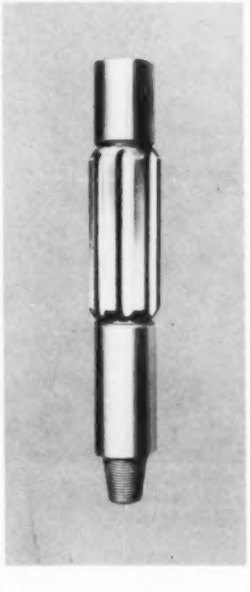
Security

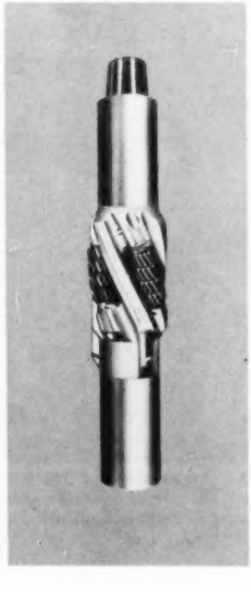
HARD FORMATION BITS ("H" Series) are produced in several types of maximum performance in rock ranging from hard abrasive sand, hard lime with chert streaks, dolomite, etc., to chert, schist, hard sand rock, quartzite, pyrite and granite. Teeth are closely spaced. Some types have an additional "L" shaped section at the outer end of the gauge teeth for added resistance to excessive wear and to breakdown under heavy weight. For extremely abrasive formations, the H7W features a notched webb on gauge teeth, providing maximum resistance to gauge wear.



HOLE OPENERS, *(left)* used to enlarge small holes drilled ahead of the main hole, are demountable, eliminating the necessity of taking equipment to a field welding shop when changing cutter assemblies. Thus, Security cutter assemblies may be changed, with simple hand tools, on the derrick floor A tool joint box on lower end of pilot shank accommodates either a rock bit where sluffing or bridging in the pilot bore may be expected, or a bull nose pilot where formations are consolidated and a clean rat hole is anticipated. Sizes range from 5⅜ to 26 inches.

CASING SCRAPERS *(right)* quickly and thoroughly remove obstructions and foreign matter from within the casing walls. This Security tool has approximately 360-degree contact with casing, the cutting teeth shearing all protrusions. Operates effectively on wire line or tubing by a straight up and down movement without rotation. The 7" tool has 20 individual shearing teeth which form 86 linear inches cutting surface. Each of four reversible cutters has two complete sets of teeth 180 degrees removed on cutter body. For casing sizes from 4 to 11¾ inches.





RUBBER STABILIZERS *(left)* of Neo-Red Rubber stabilize drill collar to minimize hole drift. This enables drill string to rotate on a true axis, allowing driller to apply more weight directly to bit. Rubber sleeve turns freely on mandrel, remaining stationary when drilling, while mandrel rotates with the string. For hole sizes 6⅝ to 12¼ inches.

REAMERS *(right)* by Security for two decades have been recognized as outstanding for efficient reaming, drill string stabilization and directional drilling. Cutters, in fluted channels, force return circulation directly past cutter teeth for efficient cleaning. Three barrel-shaped cutters, at an angle in reamer body, contact over one-third of wall circumference at all times, yet maintain contact with formation over their entire length. Assures clean, full gauge holes—faster drilling. Unique locking device provides operational safety, eliminates costly body repairs, and simplifies cutter replacement on the rig. Sizes range from 3¾ to 27 inches.

Security

ONE OF THE DRESSER INDUSTRIES

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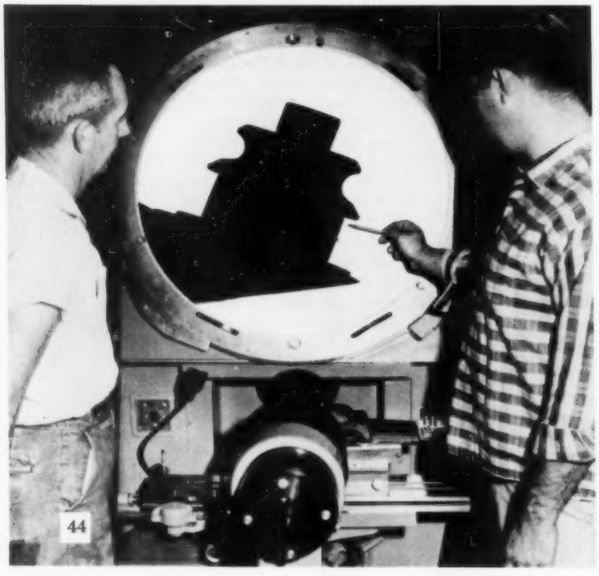
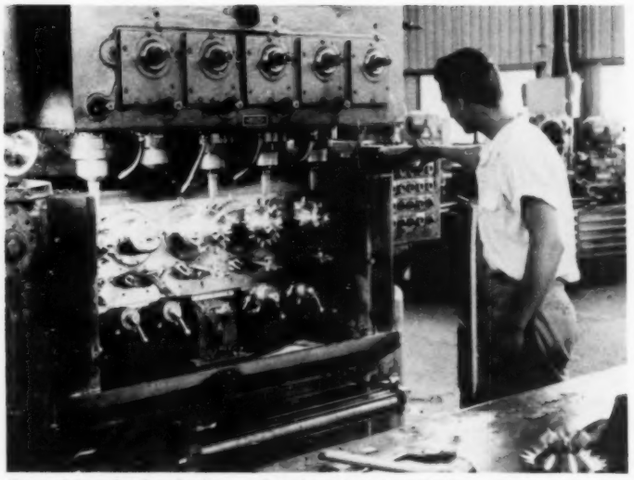
Manufacturing
ENGLAND:
Security Rock Bits Ltd.
Whitworth St. Works
Openshaw, Manchester 11

Production quality control is maintained at highest possible level by applying precision inspection methods to each and every Security Rock Bit component. Many of Security's testing methods are unique, having been developed by Security's inspection engineers to achieve maximum standards.





One of hundreds of pieces of automatic, time-saving, precision manufacturing equipment at Security's plants, this multi-spindle milling machine shapes cutter teeth to microscopic tolerances for high uniform quality.

Highly-trained design engineers in close cooperation with alert field engineers constantly seek ways and means of improving the quality and performance of Security Rock Bits and other sub-surface tools.

Incoming basic materials are subjected to detailed, spectrographic and X-Ray diffraction analyses, by laboratory engineers, to assure uniformly-high metallurgical standards.

SIE

First in Geophysical Instrumentation

SOUTHWESTERN INDUSTRIAL ELECTRONICS CO.

Southwestern Industrial Electronics Company, the world's largest manufacturer of geophysical instruments, is headquartered at Houston, Texas, U.S.A. Branch offices are maintained in Canada and Mexico, and SIE representatives are stationed throughout the world.

SIE seismograph equipment is the first choice of oil exploration organizations everywhere. From compact lightweight portable systems to complex laboratory installations, SIE manufactures conventional and full-spectrum seismographs, field and laboratory magnetic recording equipment, and a full line of seismograph accessories including oscillographs, blasters, geophones, and related items. SIE's leadership in seismic instrumentation is evidenced by the more than 330 complete SIE seismic systems now in use 'round the world.

Other SIE products include a magnetic amplifier analog computer system for the direct reading of fluid and gas flow from orfice meter installations, and computers for process control, data reduction and general industrial automation. The company also manufactures electronic laboratory test instruments and recorders and a full line of miniaturized low-frequency transformers and reactors for aircraft, guided missile, computing and geophysical applications.

Part of the SIE line is described in the following pages, and detailed brochures and information will be furnished on request. SIE instruments are often modified to meet specific requirements, and special project inquiries are welcomed.

Many leading industrial organizations utilize SIE engineering and research facilities in their special instrument design programs. The long list of successful projects completed for these firms during the past 11 years is a continuing tribute to the company's ability to originate unique designs and to bring them to practical production.

Presently occupying 40,000 square feet of floor space in six modern air-conditioned buildings, SIE employs more than 400 qualified engineers and technicians. The completely equipped machine shop, metal working division, and special transformer design and manufacturing facilities enable SIE to produce new answers to development problems with minimum delay and to maintain the highest standards of quality in all of its products. This combination of highly trained technical personnel, special manufacturing facilities, and world-wide experience in the manufacture of electronic and electro-mechanical equipment enables SIE to meet every demand for dependable, accurate and versatile industrial instrumentation.

Five men can "back-pack" a complete SIE Portable Seismograph System into jungle or mountain areas. Miniaturized equipment is equal in performance and flexibility to full sized systems usually mounted in trucks.

SIE INSTRUMENTS AND ACCESSORIES

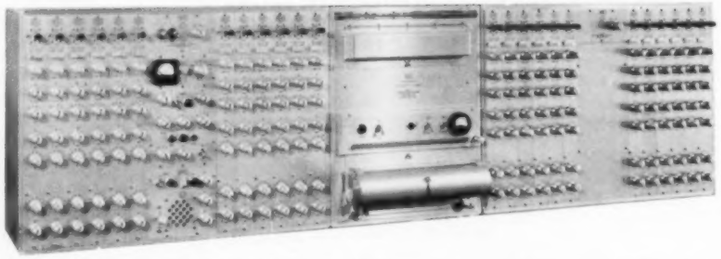
SIE G Series Seismograph Systems are used for either conventional recording or with any type of magnetic recording media. They meet every requirement for flexibility, dependability and accuracy in geophysical instrumentation and can be ordered with many operational and equipment options for special applications.

G Series systems are designed for installation in field vehicles or for laboratory use. Amplifier chassis and the system cases are constructed of formed and welded anodized aluminum. Amplifiers and control sections are of the plug-in type to simplify maintenance; any of the units can be replaced in a few moments. Any number of channels up to 48 can be supplied.

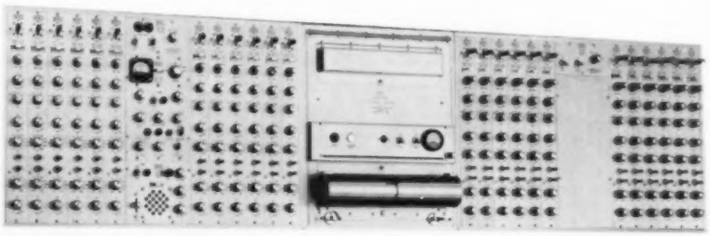
Critical components are hermetically sealed for protection from moisture and temperature changes, and amplifier wiring is also silicon sprayed.

AGC Time-Constants, mixing method and percentage, and type of record presentation are selected from front panel.

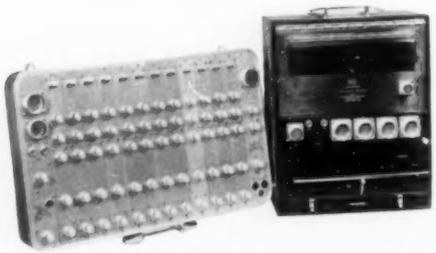
G Series Systems have found wide application in "critical area" operations, and are the most versatile equipment.



G-22A High Production Seismograph System features maximum ease of operation combined with great flexibility. Having the same low distortion and wide AGC control range as the G-33, the G-22A covers frequencies used in reflection recording. Hundreds of filtering combinations available.



G-33 Full-Spectrum Seismograph System for Reflection-Refraction and High Frequency recording of seismic frequencies from 4 to 600 cycles per second. Equipped with the SIE three-speed oscillograph, the G-33 thus replaces three convention seismographs. AGC Control Range: 0.5 microvolt to 0.1 volt input (three time-constants selected from front panel). Gain Control Circuits: AGC, Expander, or simultaneous AGC-Expander operation. Record Presentation: Single record. Dual Output. Dual Record. Distortion: Less than 1%.

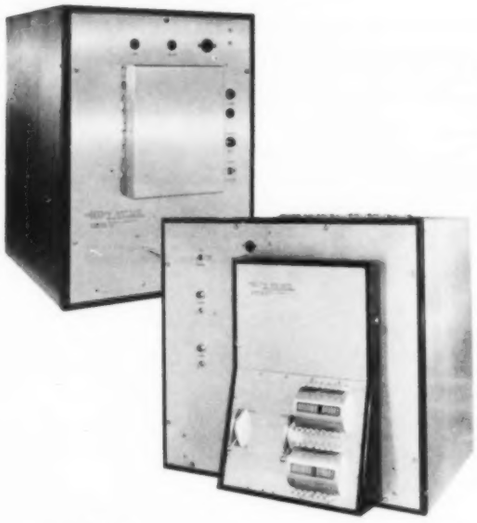


P-15 Portable Seismograph System is used for high-frequency seismic recording from 70 to 450 cycles per second. Individual plug-in GA-15 amplifiers can be used with P-11 units, thus lowering equipment costs. Special AGC characteristics provide faster control required in high-frequency recording.

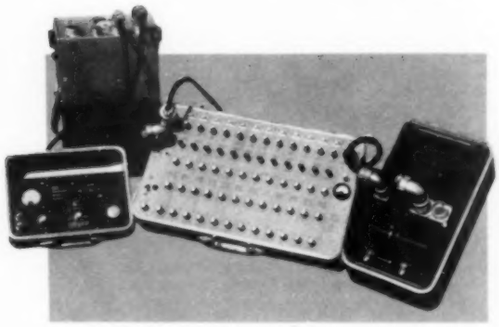
P-11 Portable Seismograph System is used for conventional reflection recording, and also used with magnetic recorders. Frequency range covers the reflection recording band. Dual losser AGC provides control from 1 microvolt to 0.1 volt input.

SIE P Series Portable Seismograph Systems are extremely light in weight, yet combine rugged dependability with full operating flexibility. Hermetically sealed, moisture protected construction is used throughout the P series. Instruments are housed in formed aluminum cases which are moisture sealed. Amplifiers are of individual plug-in construction. Packaging is arranged to limit weight to no more than 50 pounds per unit, to facilitate "back packing" into difficult areas. P series instruments are also often installed in field vehicles. Several hundred of these famous instruments are now in use throughout the world.

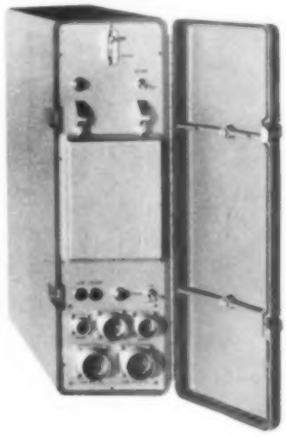
SIE



SIE MR-4 and MR-5 Magnetic Recorders are the product of the most intensive research and development program in the company's history. Featuring extremely precise control of tape transport speed and very favorable signal-to-noise ratio characteristics, these instruments have achieved immediate and wide acceptance in seismic recording applications. MR series recorders are housed in moisture protected, anodized aluminum cases. Components are protected against shock and vibration and are designed to give trouble-free service in the field or laboratory. These instruments are available with or without Direct-Viewing equipment and other accessories. The MR-4 system offers ease of operation in either field recording or laboratory use in a lightweight design. The MR-5 features twin tape transport and individual head positioning controls for record compositing techniques. Frequency Range: 1 to 500 CPS. Signal-to-Noise Ratio: in excess of 60 db. Distortion: Less than 1%. Record Length: 5½ seconds. Channels: 24 to 48 data, 4 to 8 control.



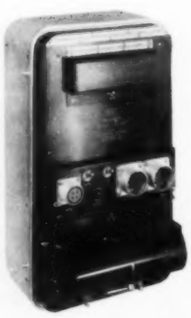
SIE P-19 Portable Refraction Seismograph System utilizes construction techniques similar to the other P series systems. Refraction method is used in over-burden determination surveys, as well as in petroleum and water exploration activities. Complete channel testing facilities and 12 amplifiers are housed in one case. Frequency response extends down to 4 cycles per second.

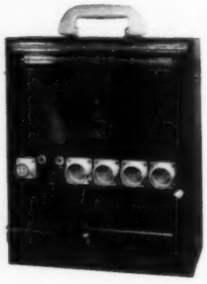


SIE PMR-6 Portable Magnetic Recorder serves as a companion unit for P and G series seismograph systems used in portable operations. Weighing only 43 pounds, the PMR-6 can be easily carried by one man. This recorder uses the same recording tape as the larger MR recorders, and operates in a similar manner. Special construction prevents water damage even if the recorder is completely submerged.

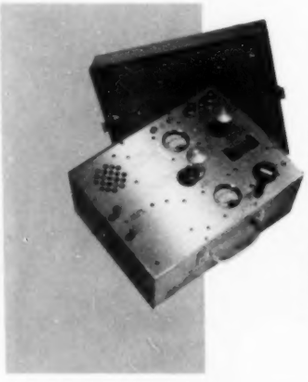
Pictured is one of the units in the SIE Flow Computing System. These analog computing devices have no moving parts and utilize magnetic amplifiers, thus eliminating vacuum tubes. This method lowers current requirements and simplifies maintenance since magnetic amplifiers do not require replacement or adjustment.

SIE computers are custom designed for various applications, and have numerous uses in process control and industrial automation.





SIE Recording Oscillographs are available in sizes from the 6″ paper width, 25 galvanometer PRO-11-6 to the 15″, 60 galvanometer RO-22-15. 10 inch oscillographs are available with the SIE Automatic Title Printer. Models can be supplied with one, two, or three speed drive motors. SIE Precision Galvanometers having natural frequencies from 60 to 500 CPS can be specified.



SIE seismograph accessories, including Blasters, are housed in heavy-duty reinforced aluminum cases. Blasters incorporate cap test circuits, positive time-break generation, and communications facilities.

SIE Geophones cover the entire seismic range. Outstanding in durability and foremost in design, tens of thousands of SIE detectors are serving throughout the world.

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One of the Dresser Industries

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Foreign Operations Department
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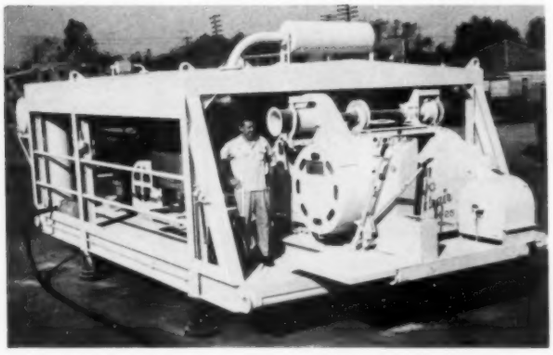
Among the leading SIE laboratory test instruments is the Model R-1 Voltmeter which is accurate within 1½% on DC voltage scales and within 3% on AC scales. The Model M-2 Oscillator covers the frequency range from 1 to 120,000 CPS with frequency stability within 0.1%. Thousands of SIE test instruments are in use in leading government and industrial laboratories.

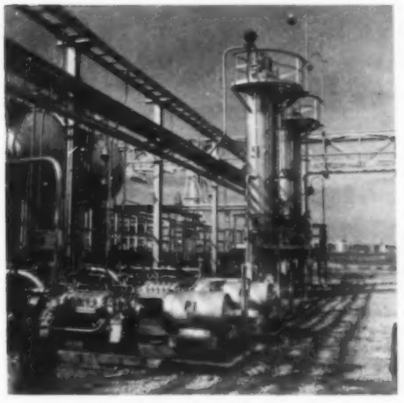
DRESSER equipment
on the job
throughout the world.



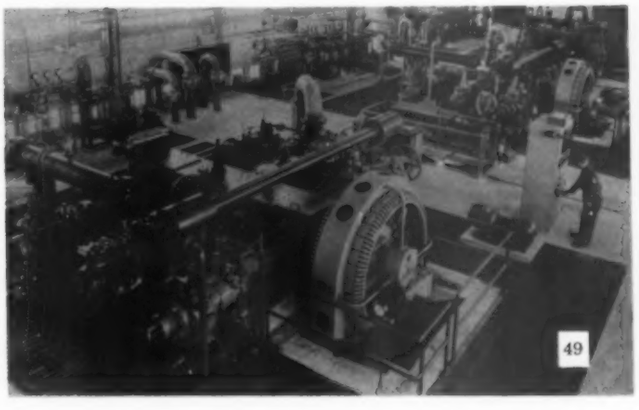
A number of these self-contained mobile drilling and workover units are in operation on Lake Maracaibo for Creole Petroleum Corp. of Venezuela. The Ideco H-25 Hydrair Hoist permanently mounted on the platform is powered by 233 intermittent h.p. diesel engines. Also contained in each unit are air compressors, light plants and water pumps. The units are lifted from a barge to drilling platforms by a large crane.

Familiar sight in world's oil fields—preparing to run Guiberson swab in hole on wire line.

Going up! Construction crewman begins the long ride up to the top of another super-tall Dresser-Ideco TV tower. Parts for the tower are hoisted in the same manner.



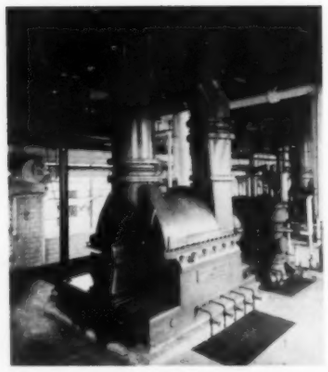
Pacific-Batignolles centrifugal pumps in propane service at the refinery of Compagnie de Raffinage Shell-Berre manufactured and serviced by Batignolles-Chatillon, 5 Rue de Monttessuy, Paris 7e, France.



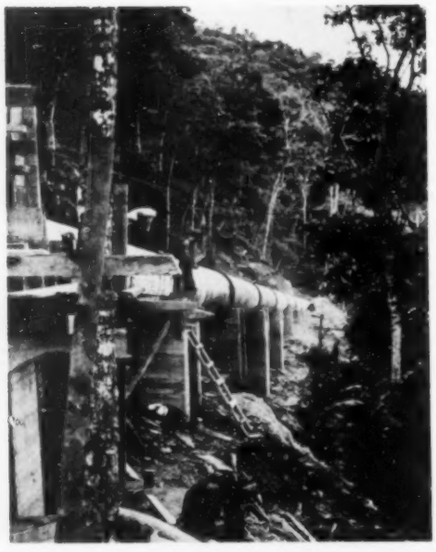
Clark Balanced/Opposed motor-driven compressors in a synthesis application in the Middle East.

(cont'd)

DRESSER equipment on the job throughout the world.

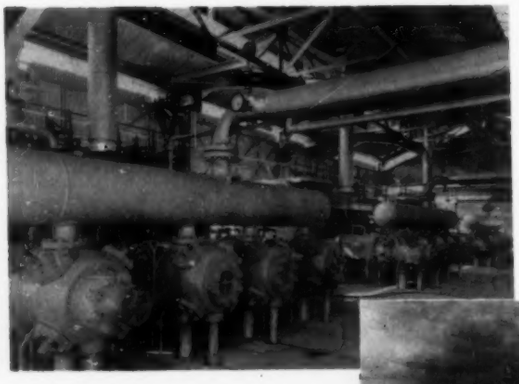


Four-stage Roots-Connersville centrifugal booster rated at 27,000 CFM driven by a steam turbine installed in a large Canadian coke oven plant.



Growing Caracas, Venezuela, need never go thirsty thanks to 17 miles of 48" water line, tightly joined by nearly 4,000 steel couplings from Dresser Manufacturing Division.

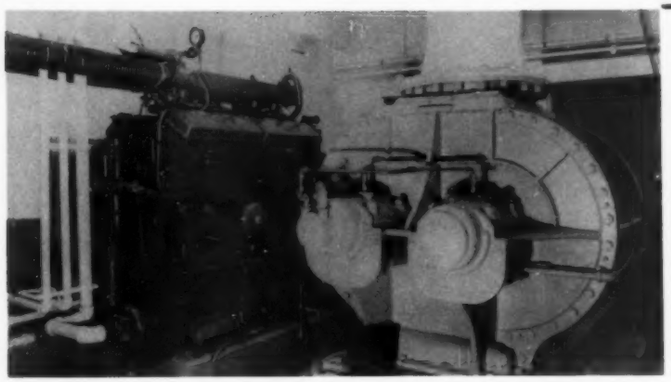
At Walton, Nova Scotia this vast Magcobar mine provides barite which is transported and processed into heavy weight drilling mud. Illustration above shows Walton Harbor at low tide. Magcobar plant is in the background.



Clark HBA-6 compressors used on reforming applications in LaVera, France.

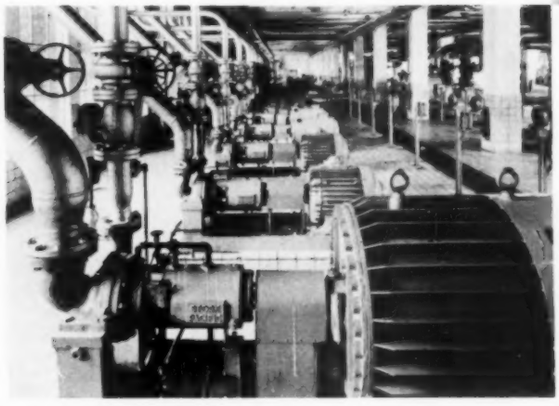
Steel going up for another pair of Ideco hangars. Buildings will be used by TWA and Capital Airlines for Constellation and Viscount maintenance. They will also house a commissary and parts storage section.

Clark Turbo-Mobile power plant in railroad tracks at Olean, N. Y. before shipment to Mexico where it will be used to meet peak loads.



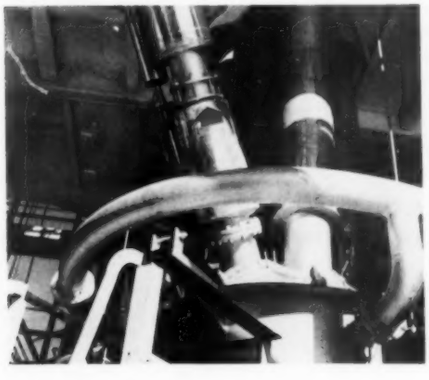
Roots-Connersville 22 x 33 Rotary Positive Blower, driven by a diesel engine, provides conveying air for wood chips in a large Canadian paper mill.

Around the clock, around the world, Guiberson's line of packers speeds the production of oil.



Stork-Pacific centrifugal pumps at the Pernis Refinery of N. V. De Bataafsche Petroleum MIJ, manufactured and serviced by Koninklijke Machinefabriek Gebr. Stork & Co. N. V. Hengelo (0) The Netherlands.

Ideco rig with Full-View mast 60 miles southwest of Calgary, Alberta, Canada. Shown is Husky-Northern-Target Savanna Creek No. 1—site of a 1955 gas discovery in the Rocky Mountain area.



Dresser couplings are widely used to connect all kinds of oil piping, as in the Minatillan refinery in Mexico.

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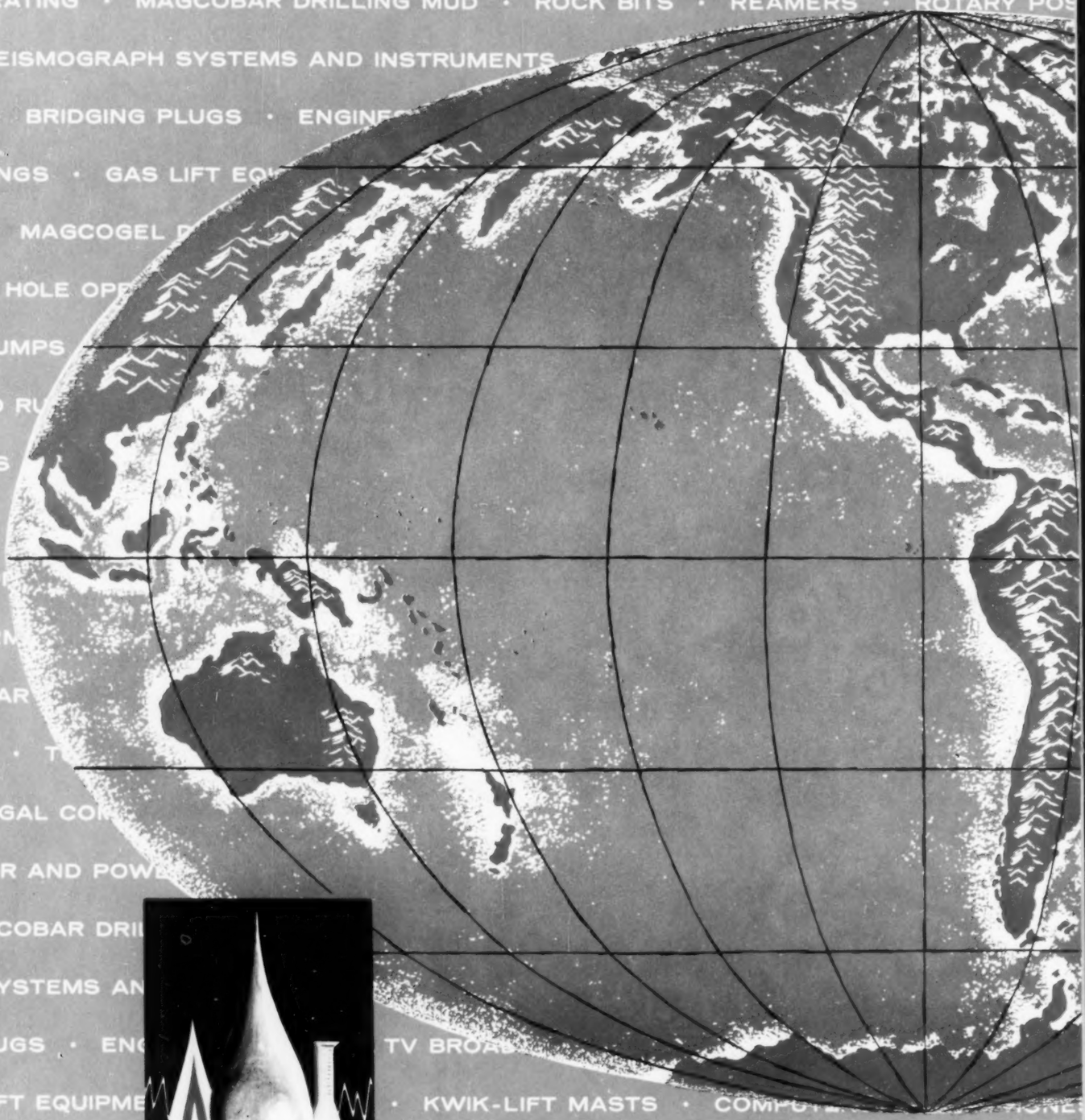

NETHERLANDS

Exploration

Operations are principally in the hands of Nederlandse Aardolie Mij. (NAM), owned equally by the Royal Dutch-Shell group and Standard Oil Co. (New Jersey). NAM holds a new concession covering about 41,000 acres extending, in the shape of a rectangle, from the three-mile zone in the North Sea over the sand dunes which border the coast southwest of The Hague, to the outskirts of Rotterdam. A discovery well was drilled in this area of western Holland near Ijsselmonde (close to Rotterdam) on the south bank of the Maas. It is presently producing about 140 b/d. Commercial production also has been obtained in wells drilled at Berkel, Delft, de Lier, Pijnacker, Rijswijk, and at Wassenaar—the latter being the first flowing well in Holland and the latest discovery. The Wassenaar well is producing oil similar to that from the Shoonebeck field, with a specific gravity of 0.905, sulfur-free.

The area of western Holland presently is supplying about 13% of the country's production, or 2,800 b/d. It may increase further when concession applications are processed during 1957. During 1955 a total of 23 oil and gas wells was completed. For late 1956 and early 1957 exploratory wells were planned at Monster, Ridderkir, and Zoetermur in de Lier—with the latter scheduled for 9,900 ft.

TABLE I

DRILLING IN THE NETHERLANDS—1955

Number of Wells Drilled		Exploration		Development	
Exploration	9	Oil (total)	6	Oil (total)	14
Development	14	Producing	3	Gas	0
		Dry	3	Dry	0
Total	23	Gas (total)	3		
		Producing	1		
		Dry	2		

Use of a turbo-drill was planned in exploration near Schoonebeck in hard formations at about 4,000 ft. However, it was not used when formations expected were not encountered, but later may be used for directional drilling.

Production

Production within Holland first began in 1943 when the Schoonebeck field was discovered. At present there is a total of 285 wells producing in the Schoonebeck field, and 5 more are scheduled to be drilled. Production during October 1956, from all sources, had mounted to 22,500 b/d as the other field discoveries came on production.

New discoveries have been made at about two per year. The Rijswijk and Andel fields were found in 1953, Delft and Berkel in 1954, and de Lier and Pijnacker in 1955. These and other new finds will supply at least 20% to 25% of Holland's oil needs for the next 20 years, according to a spokesman for NAM.

In addition to its crude production, NAM also has developed gas fields north of Schoonebeck in the neighborhoods of Assen and Enschede. The gas companies offered to supply the government with 14 million cubic feet yearly during the next 20 years—which amounts to about one-fourth of the State's requirements. In addition, refinery gas from Pernis is being supplied to Rotterdam and the surrounding district.

During the first quarter of 1957 production is to be increased to about 29,100 b/d, to make up temporarily the shortage resulting from the Suez crisis.

TABLE II

NETHERLANDS CRUDE-OIL PRODUCTION—1956

(Thousands of Barrels Per Day)

January	19.2	July	21.2
February	17.0	August	20.9
March	19.2	September	21.5
April	20.0	October	22.5
May	20.6	November	22.0*
June	21.3	December	21.9*
		Year	20.6*

* Estimate.

Refining

There are two principal refineries in Holland, of which the major plant is the Pernis refinery of Shell. It is a fully integrated refinery which produces all types of petroleum products as well as petrochemicals. Some 20 different crude types are handled—7 of them from local fields and 13 from imported crudes.

A second major plant is owned by Caltex Petroleum (Nederland) Mij., at Pernis. It has a capacity of 37,000 b/d.

Standard Oil Co. (New Jersey) announced, in June 1956, that Esso Nederland NV would build a 30,000 b/d to 40,000 b/d refinery near Rotterdam, to be completed in 1960.

OIL LAWS

Oil exploration and development in The Netherlands are governed by the old Napoleonic law of April 21, 1810, designated as "Loi du 21 Avril 1810 concernant les Mines, les Minières, et les Carrières."

The law is a very general one. It imposes no restrictions on exploration, except permission from the surface owner. In the event the owner refuses such permission, authorization may be obtained from the government, which overrules the owner of the land.

All subsoil rights belong to the nation, and exploitation thereof may take place only under a concession which is granted by decree. An exploitation concession cannot be granted unless the presence of oil in commercial quantities has been shown. Between discovery and the granting of the concession, a temporary permit for disposing of production may be obtained, known as a "permis de vente."

TABLE III—NETHERLANDS REFINERIES

(Barrels Daily)

Name of Company	Plant Location	Capacity Crude	Plant Type	Capacity Cracking
NV de Bataafsche Petroleum Mij. (Shell)	Pernis [1]	220,000	Comp.	53,000 TC
Caltex Petroleum Mij. NV	Pernis [2]	41,000	SC	9,000 T

[1] 10,000 b/d thermal reforming capacity, 20,000 b/d thermal cracking capacity, and 33,000 b/d catalytic cracking capacity A 33,000 b/d catalytic cracker complete third quarter 1956; A 12,700 b/d catalytic reformer complete third quarter 1956; and 7,800 b/d cycle oil and 16,400 b/d gas-oil units under construction; complete third quarter 1957.

[2] 6,000 b/d thermal reforming capacity. A Platformer and Unifiner under construction; complete 1957.

S—Skimming. C—Cracking. T—Thermal. C (under Cracking)—Catalytic.

The law is a very general one. It imposes no restrictions on exploration, except permission from the surface owner. In the event the owner refuses such permission, authorization may be obtained from the government, which overrules the owner of the land.

All applicants for concessions must prove they possess adequate financial resources and technical knowledge. There is no limitation on foreign ownership of concessions.

There is no specified limit to the duration of the concession. Neither are there any specified limits to the size of the area which may be obtained.

There are no specified obligations for drilling, nor other work, imposed on the concessionaire. However, if he does not work the concession and is not active after notification by the government, after a term of one year the concession may be cancelled, and later granted to any third party.

Fiscal obligations of the concession include compensatory payments to the landowner. These are not specified in the law, but are to be contained in the concession text when the concession is granted. In concessions granted to date, the amounts have been either 0.50 florins per hectare yearly or a lump sum payment of 12.50 florins per hectare. There is no fixed rental payable to the government.

In the event the landowner does not voluntarily permit occupation of his land for purposes of exploitation, the law gives the concessionaire the right to occupy same—although title to the property does not thereby pass to the concessionaire. The landowner may demand yearly payment equal to twice "produit net" of his land—which, presumably, would mean twice the expected net earnings from agriculture or other purposes for which the land had been used; otherwise the landowner can demand that the concessionaire buy the land at a price to be fixed by the courts.

It has been government practice to include in the concession deed several obligations which are not contained in the law. These include the obligation to furnish reports on production and other activities, a clause to the effect that the 1939 regulations concerning safety are to be observed, specifications on demarkation of concession limits, and other obligations.

The government has imposed a special contract on oil operators which takes the place of royalty payments—not specified in the law. The contract imposes a special "benefit" which amounts to 10% of the net profits earned by the company, with a minimum of 1 florin per gross metric ton of water-free crude. Net profits are defined precisely by subtraction from gross profits (plus interest obtained on the reserve fund) of all taxes and other charges imposed by the law, plus costs of exploration and exploitation, depreciation, yearly payments into the statutory reserve fund of the company (which is limited to 10% of net profits), and all other expenditures chargeable to profit-and-loss account, in accordance with sound business practice.

The concessionaire is subject to all general taxes of the country as well. The principal one of these is the tax on profits of a limited liability company—which varies between 40% and 43%. Taxable income is calculated on nearly the same basis as for the government's 10% "benefit," which is deductible for calculation of profits. Payment of the profits tax itself is not deductible, nor are payments into the reserve fund. Two incentives are provided for in the calculation of the taxable profits. These include accelerated depreciation of fixed assets amounting to one-third of the purchase price, and an investment allowance which is grantable over and above depreciation.

The aggregate of the taxes payable by concessionaires (including normal taxes plus the special "benefit") amounts to between 46% and 48% of the oil company's profits.

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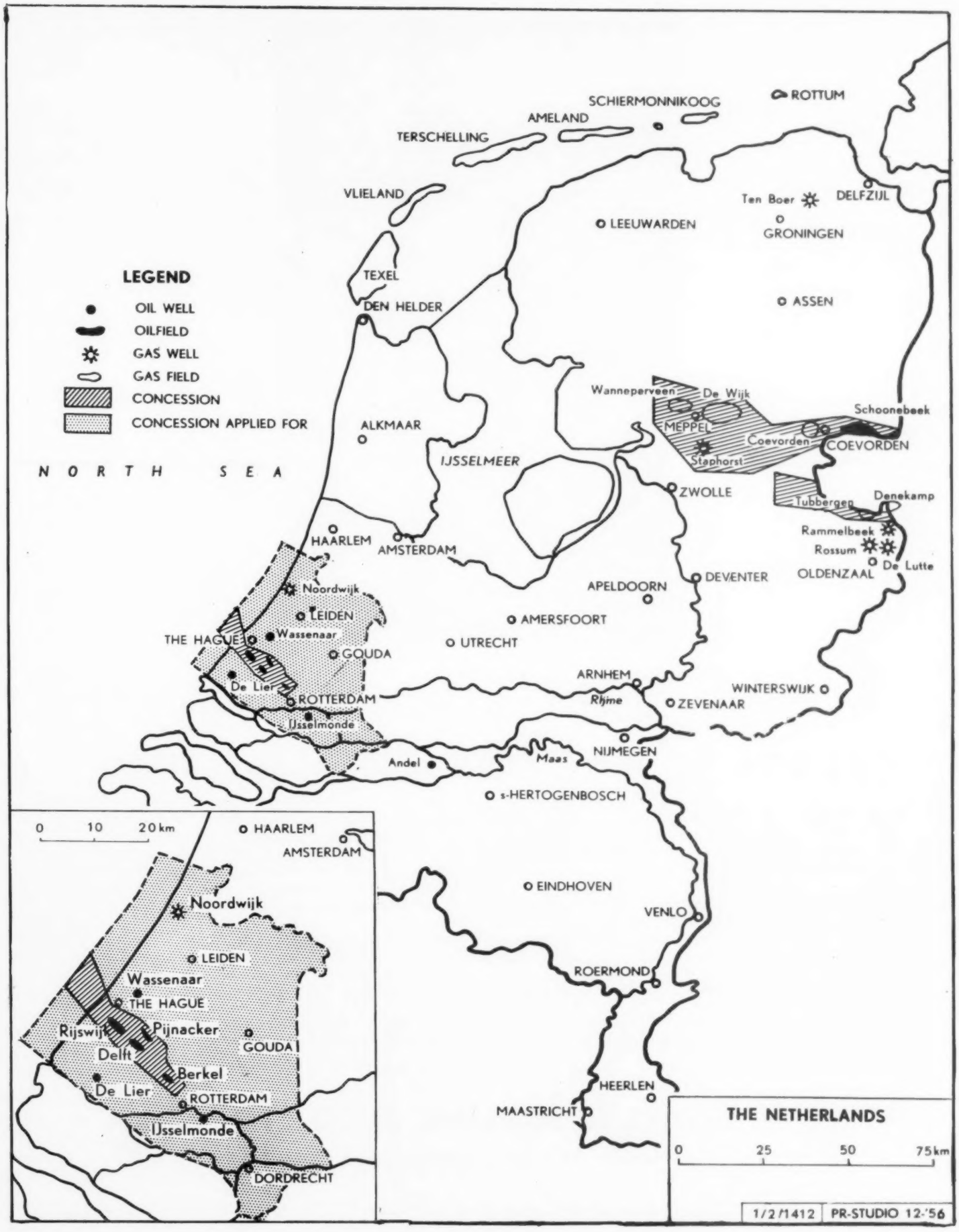
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OIL WELL
OILFIELD
GAS WELL
GAS FIELD
CONCESSION
CONCESSION APPLIED FOR
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SCHIERMONNIKOOG
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AMELAND
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MEPPEL
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Denekamp
Rammelbeek
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De Lutte
OLDENZAAL
HAARLEM
AMSTERDAM
DEVENTER
APELDOORN
Noordwijk
LEIDEN
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THE HAGUE
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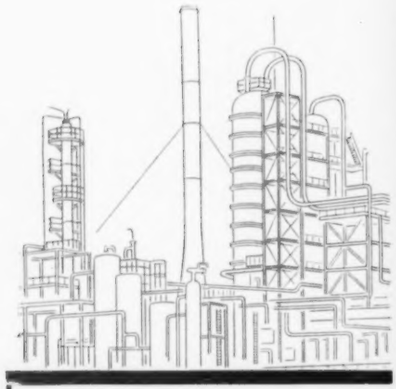

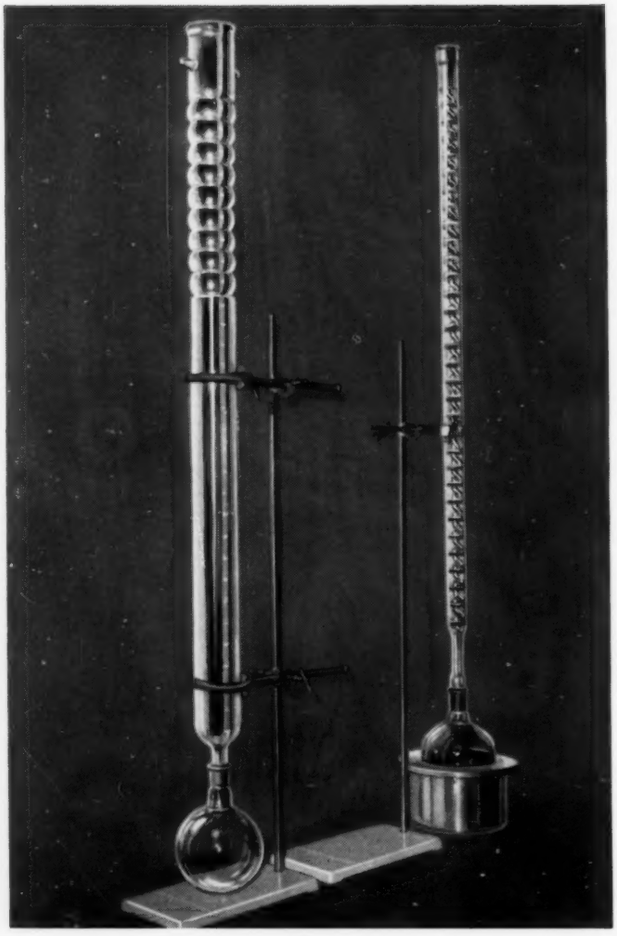

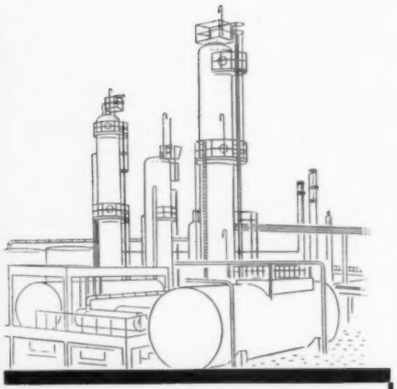

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We repeat, the 'PYREX' Oldershaw perforated plate Column ensures accurate analytical batch distillations. Moreover, it is easy to operate, has low H.E.T.P., and is suitable for corrosive liquids.

Is of especial value for the analysis of hydrocarbon mixtures, combines low operating hold-up per theoretical plate, and a negligible static, or non-drainable hold-up, with a high capacity or reflux note.

The 'PYREX' Oldershaw Column is constructed of a series of perforated glass plates sealed into a tube. Each plate, with its exactly positioned holes of uniform bore, has a baffle to direct the flow of liquid, a weir to maintain a liquid level in the plate, and a drain-pipe. The first plate serves as the reservoir necessary to maintain a liquid seal for the drain-pipe from the first of the plates above.

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NICARAGUA

Exploration

Exploration for petroleum in the past has been carried on by many individuals and independent companies. The chief holding, however, was the Miguel d'Escoto concession which was explored by American International Fuel and Petroleum Co. (subsidiary of both Gulf and Atlantic), the terms of which are summarized later. The Miguel d'Escoto holding now constitutes the only concession in the country, covering the areas indicated on the accompanying map. There is no known activity in exploration on this concession at present.

Production, Refining, Marketing

There is no production or refining in Nicaragua. The total value of petroleum imports during 1954, the only source of domestic consumption, amounted to 3,732,144 US dollars. It was composed of 2,027,495 gal of aviation gasoline; 11,542,818 gal of other gasolines; 32,261, solvents; 3,964,608, kerosine; and 15,375,131, gas oil. In addition, there were 7,480,000 lb of greases and lubricants; 2,156,000, lb asphalts; 184,000, vaseline; and 1,056,000, paraffin.

OIL LAWS

The Constitution (Art. 78) provides that concessions on natural resources (including petroleum) shall be granted according to the laws in force, and shall not constitute monopolies. Art. 225 states that the subsoil is the property of the nation, and that concessions granted shall only be on the basis of a government share in profits.

The Mining Code of 1906 and the Law on Hydrocarbons of 1933 provide only general rules for the granting of concessions. The executive of the government has a large amount of freedom within which concession terms may be fixed.

The concessionaire must satisfy the Ministry of Development that he is capable of fulfilling the operations requirements stated in the contract or concession; that he has selected a specific and designated zone for exploration; and generally has fulfilled all requirements of the contract to date. In case of dispute over concession lands between two or more concessionaires, the right is granted to the party who proves his fulfillment of the contract requirements. These requirements are generally the continuance of uninterrupted exploration work. Any concessionaire who suspends work for more than six months is disqualified. The government is given the right of inspection covering concession area and operations at any time.

CONCESSION CONTRACTS: The principal concession, awarded in 1935, is the Miguel d'Escoto and Joseph J. Coney concession contract which was held by American International Fuel and Petroleum Co. (Gulf Oil Corp. subsidiary) until about 1949. The concession includes submerged areas extending 5 km beyond the coast.

Its term was originally three years, with right to three years' extension. These extensions were continued throughout contract life, beginning in 1935. The contract was temporarily suspended in 1943, restored on July 7, 1955, and made exclusive to December 31, 1958, at which time the exploration rights will terminate unless extended again.

The contract provides for a minimum exploratory expenditure of cordobas 25,000 (US $5,000) during the first general exploration period of 3 years. Within six months following the first three-year period a report was to be made on geology studied, and lots were to be selected for exclusive exploration, which could be located anywhere in the republic provided they did not exceed 30,000 hectares each (74,131 acres) and their total area was not more than half of the republic's area (which would make the maximum approximately 18,285,670 acres). Within each lot so selected, the concessionaire was enabled to continue exploration for three years, with right to select any area for exploitation.

Exploitation areas were divided into lots of not more than 500 hectares (1,236 acres) each on dry land, or 10,000 hectares (24,710 acres) for offshore areas. Total of the exploitation acreage selected was not to exceed one-half the exclusive exploration area, or one-fifth the total area of the republic. This limited the total of exploitation acreage to approximately 11,428 square miles.

Duration of the exploitation concessions was 50 years. An initial exploitation tax of cordobas 0.10 per hectare of the exploitation lots was payable on dry land; on offshore areas the tax was reduced to one-half this level, payable only on areas actually being exploited, rather than the total area of the exploitation concession.

A royalty was imposed ranging from 7% on the first 200,000 bbl of production to 8% from 200,000 to 300,000; 9% from 300,000 to 500,000, and 10% thereafter. These royalties were reduced by 25% if the concessions were located more than 30 km (18.6 miles) from the seacoast. Royalty was payable semi-annually in kind or in cash. If the latter, the price was the average market price at the well, to be determined by the New York price less transportation from the well to New York if a price was not available at well site. If in kind, the concessionaire was obliged to maintain 30 days' storage for up to 200,000 bbl.

The concessionaire was exempt from all general and local taxes, including import and export duties. The right of transfer of the concession was contained, as well as the right to suspend operations in case of *force majeure*.

Free surrender of any or all of the concession was provided. Suspension and forfeiture were also provided, if obligations were not met within six months of notice.

NATIONAL FACTORS

Nicaragua is a republic, with a congress of two houses and a president elected for six years. The former president, General Anastasio Somoza, was assassinated in 1956. He had ruled since 1936, three years after the US Marines discontinued their occupation of Nicaragua, and controlled the army since 1934 when he was recommended as army head by the American minister. He was succeeded by his son.

The United States has a special interest in Nicaragua's stability, since by the Bryan-Chamarro treaty of 1916 rights are held by the USA for a canal through Nicaragua as a substitute for the Panama Canal, as well as a naval base in the Bay of Fonseca on the Pacific Coast and Corn Island on the Atlantic Coast.

There exists a sharp geographic and ethnic division between the western half of the country, where more than 69% of the 1,092,759 population is found, and the eastern, which is virtually cut off. The total of 258 miles of railways, located on the west coast, is mostly antiquated and in poor condition. Although roads are generally passable only in the dry season, the Inter-American Highway is open in all weather across Nicaragua from the Honduras border to Costa Rica. The principal port of Corinto on the Pacific Coast is the only one with rail connections. Managua, the capital, is not an ocean port.

By special law of February 26, 1955, foreign capital entering Nicaragua for approved investment enjoys the right of free withdrawal at any time, free and unrestricted remission of net profits, and free re-export and transfer of equipment and materials. National treatment of such capital is guaranteed. The unit of currency is the cordoba, with a par value of five cordobas per US dollar. The exchange-rate system is based on two official rates of five and seven cordobas per US dollar. By mixing these rates in different proportions and adding surcharges of one and three cordobas per dollar, several rates are established for different categories. For imports of registered capital, cordobas are purchased at 7.00 per dollar. Remittances of registered capital are at the rate of 7.0525 per dollar. For essential imports (category I), the rate is 7.0525 per dollar. For semi-essential imports (category II) and nonessential imports (category III) surcharges of 1 and 3 cordobas are added—making the rate 8.0525 for the former and 10.0525 for the latter. All imports are subject to authorization. Remittances of profits and amortization of registered foreign capital are at the 7.0525 rate, and require authorization by the national bank. Remittances for amortization may not exceed 10% yearly of the capital invested. Shareholders pay the regular income-tax rates on dividends unless the corporation has paid an income tax on profits, in which case there is no tax on dividends. There is no treaty with the United States for avoidance of double taxation. Income taxation ranges from 4% on $5,672 income to 18% on income in excess of $141,800.

The labor supply, especially as regards skilled industrial labor, is short. The Nicaraguan labor regulations, however, are not oppressive. Generally, relations between an employer and employees are established in a written contract. Among other requirements, the employer is obligated to ask written permission for the employment of foreigners. At least 75% of the labor force must be Nicaraguan, and laborers must be paid equal wages for similar work performed by foreigners. Other provisions of the Labor Code of 1945 and other legislation include: an 8-hour working day limited to 48 hours per week, although up to 3 times weekly the day may be increased to 11 hours; 8 legal holidays per year; 2 weeks' vacation per year; overtime is given at 100%. END

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NEUTRAL ZONE

Exploration

The entire area of the Neutral Zone indicated on the accompanying map is under concession to two independent American petroleum companies. Since the Neutral Zone is owned jointly by Kuwait and Saudi Arabia, two concessions were granted—one for Kuwait's "undivided half-interest," which was granted to American Independent Oil Co. (referred to hereafter as AMINOIL), and another covering Saudi Arabia's interest granted to Pacific Western Oil Corp. (now Getty Oil Co.). Aminoil's concession was dated June 28, 1948.

On February 20, 1949 the Pacific Western Oil Corp. acquired a similar concession covering all of the king of Saudi Arabia's undivided half-interest in the Neutral Zone.

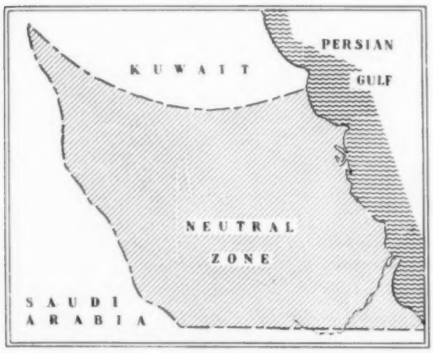
Aminoil drilled its first exploratory well in the Wafra zone, about 20 miles south of the Burgan field in Kuwait, in late 1949. This well and the next four were dry, and not until the sixth well did production come in from about 3,500 ft in what appears to correspond to the first producing sand of the Burgan formations. This well yielded oil in March 1953 and, by the end of the year, 5 producing wells had been drilled. That year 10,000 bbl of oil were produced for storage. In 1954, 15 additional wells were drilled, of which 11 were producers, 3 dry, and 1 drilling at year's end. During November 1954 production was obtained from a deep test at the Ratawi level at 6,725 ft. Wells in the Fuwaris and Graya have both turned out dry.

During 1956 little exploration was carried out, as efforts were concentrated on raising output through development drilling. The Ratawi zone is to go on production shortly, and exploratory drilling reportedly tested the shallow Eocene horizon. A new well, located 1¼ miles east of the nearest well in East Wafra field, showed good oil indications from about 3,500 ft, where the company said the first Burgan sand had been encountered—the same producing horizons found in Wafra field. It may indicate a new field or an eastward extension of Wafra.

The only producing field, Wafra, has increased production through the drilling of additional wells on a one-mile spacing pattern to define the limits of the field. By January 1, 1956 a total of 29 producers (all from the Burgan sand) had been completed, and the spacing pattern was reduced to ½ mile. Production during 1955 was 24,161 b/d.

Production oil is of 24 to 26 API gravity, compared with about 32 to 36 API elsewhere in the Middle East; and sulfur content is high.

Reserves as of January 1, 1956 were estimated at 500,000,000 bbl of recoverable oil.



Transportation

Transportation of the oil was originally by an 8-in. and 10-in. pipeline built by Aminoil 34 miles to a marine terminal at Mena al Ahmadi, in Kuwait. Facilities included a 16-in. 7,600-bbl-per-hour submarine loading line extending about 9,500 ft into 48 ft of water in the Persian Gulf, and 320,000 bbl of storage capacity.

These facilities were used until the Saudi Arabian government objected that Getty Oil Co. had not provided in its concession for pipelines outside the Neutral Zone, and a 10-in. line was built from the field to Ras As Zor on the northern coast of the Neutral Zone, to be known as Mena Saud terminal. A 20-in. submarine loading line is provided, which extends 9,000 ft to 10,000 ft out from shore. Two 80,000-bbl storage tanks have been installed, with warehousing and housing facilities.

Refining and Exports

There is no refining in the Neutral Zone as yet.

Exports began in January 1954, and continued throughout the year for a total of 5,701,000 bbl, or about 16,000 b/d. Exports of crude by Aminoil were 3,835,034 bbl during the first 8 months of 1956. Exports by Getty Oil for the same period were 3,817,315 bbl.

OIL LAWS

The two companies are governed by the terms of their respective concessions, which are by the Sheikh of Kuwait in the case of Aminoil, and by the government of Saudi Arabia in the case of Getty Oil Co.

The duration of the concessions is 60 years in each case. The entire area of the Neutral Zone is covered—including islands and territorial water for a distance of six miles.

A drilling obligation is imposed on each, which required 5,000 ft by the end of 2 years and 16,000 ft by the end of 3 years in the case of Getty Oil; and 4,000 ft by the end of 4 years, 16,000 ft by the end of 10 years, and 40,000 ft by the end of 20 years in the case of Aminoil.

There is a refining commitment to be met by both companies. Aminoil must construct a refinery when production reaches 15,000 English tons (about 105,000 b/d). The capacity of the refinery may not be less than 1,500 English tons daily (about 10,500 b/d).

Getty Oil is committed to build a refinery when production reaches 75,000 b/d over a 90-day period—the capacity of the refinery to be not less than 12,000 b/d and capable of producing aviation gasoline.

Getty Oil must supply the domestic Saudi Arabian market—free of charge, one year following the construction of the refinery mentioned—with 100,000 gal per year of gasoline and 50,000 gal of kerosine and/or gasoline. The government may require 75,000 gal of aviation gasoline yearly instead. The government also has the right to purchase up to 20% of production (including crude, natural gas, refined or other products) for its own use at a 5% discount over any other purchaser. Special provisions are made for asphalt supplies.

Fiscal Provisions: Getty Oil is committed to an annual advance of $1 million, returnable against royalties but otherwise nonreturnable (therefore, a type of minimum royalty payment). Aminoil is committed to a minimum royalty of $625,000 annually. Royalty scales vary from USA $2.50 per English ton (about 33.3 USA cents per barrel) for Aminoil, to USA $0.55 per barrel for Getty Oil. In both cases, royalties are payable on the basis of net crude production—after deduction of foreign substances, such as water, and company use. The minimum royalty payable by Getty Oil is lowered to conform to the "good oil-field practices" to which the company is committed. On natural gas, the companies pay 12.5% of gross-sales income.

Exemption from export, import, and similar taxes is given to both companies; however, payment must be made for this exemption. In the case of Aminoil, a payment of 7.6 cents per English ton of crude production is assessed. Provision likewise is made for payment of a tax by Getty Oil—without the amount thereof being specified, but with the understanding that it may be levied only if full credit is allowed the company by any other government which will allow full recovery of same.

The Saudi Arabian government is given 20% of net refinery profits, as well as 25% of net-sales income on unrefined products—net-sales profits being defined as before foreign taxes and according to accounting practices used in the Mid Continent area of the United States. Aminoil is granted a 15% ownership interest, free of any financial obligation to the Sheikh of Kuwait, in the subsidiary company exploring and exploiting in the Neutral Zone, as well as a similar interest in any refining company to be formed.

NATIONAL FACTORS

Factors affecting investment in the Neutral Zone include the disposition of the crude. The companies do not have established market outlets for their production. The quality of the crude oil and its high sulfur content no longer make export sales difficult, but companies must insure that their sales are not at the expense of markets for Arabian or Kuwait oil produced by Aramco or KOC; for this would not be desirable from those governments' standpoint.

Since the obligations of the companies are in dollars, the majority of sales must be to dollar markets—which further restricts the potential sales area.

TABLE I—NEUTRAL ZONE CRUDE PRODUCTION—1956
(Thousands of Barrels Per Day)

January	30.0*	July	40.0*
February	31.0*	August	40.0*
March	31.9*	September	40.0*
April	34.9*	October	40.0*
May	36.9*	November	40.0*
June	39.7*	December	40.0*
		Year	37.0*

*Estimate.

Another difficulty anticipated is in the concession agreements themselves. They were completed just before the 50-50 agreements began to spread in the Middle East. As a result, there will probably be pressure for change by the governments at some future date. In addition, the differences between the concessions lead to difficulties in cooperation between them—as exemplified in the objections of the Saudi Arabian government to use of the Aminoil pipeline by Getty Oil. END

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PAKISTAN

Exploration

Exploration in Pakistan before World War I resulted in the discovery of the Khaur field, located in the Punjab, in 1915. Subsequently the Dhulian field was discovered in 1937; the Joyamair in 1944; and the largest field to date, Balkassar, in 1946. All of these are located in the Punjab province of West Pakistan, about 700 miles from the coast—in the Potwar basin, south and southwest of Rawalpindi.

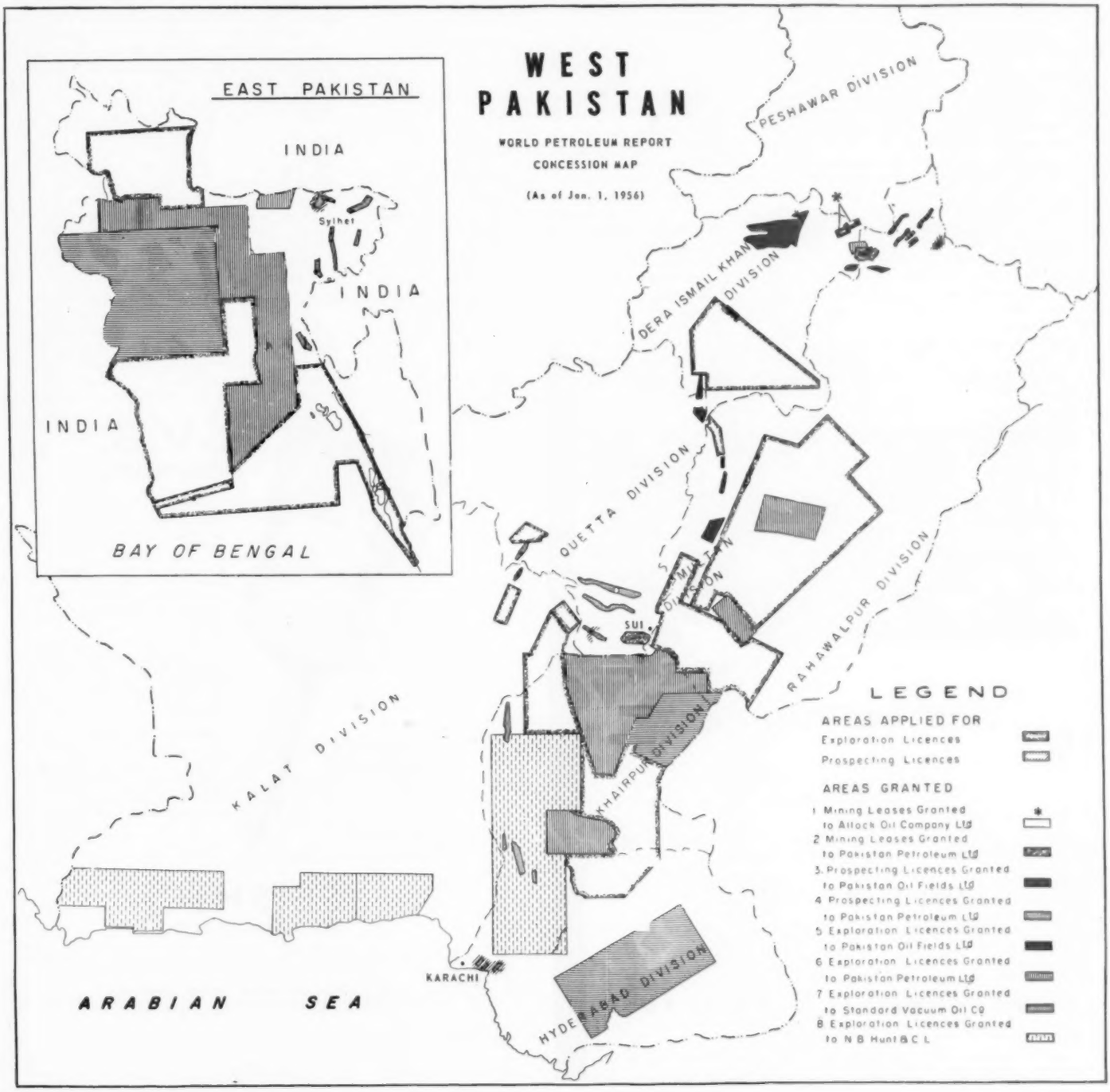
All discoveries were made by the Attock Oil Co., which has entered into certain operational and financial arrangements with the Burmah Oil group. Pakistan Petroleum Ltd., a wholly owned subsidiary of the Burmah Oil Co., was formed for exploration in Pakistan after the partition of India and Pakistan, and has a share in the production.

The major recent discovery has been of natural gas at Sui, in Baluchistan, far to the north of West Pakistan. The discovery was announced in November 1952, and reserves are estimated at about 4.5 trillion cubic feet.

During 1955 Pakistan Petroleum Ltd. discovered more gas at Uch, west of Sui, at 6,000 ft. In East Pakistan the company discovered the first commercial gas at around 7,800 ft in Sylhet well No. 1 in East Pakistan.

Standard Vacuum holds concessions in both the West Pakistan basin and the Bengal basin of East Pakistan, totaling about 20,000 square miles. The company announced during 1956 that a deep test well is being drilled 10 miles north of Jhudo in the vicinity of Sind, West Pakistan. The contracting driller is Southwestern Asia Drilling Co. An unusual feature of the concession is the government's participation to the extent of contributing 25% of the exploration expenses and receiving 25% of any production found. The agreement reportedly carries a depletion clause which, together with the provisions of the petroleum law, results in an eventual 50-50 split of profits.

Two similar contracts were signed during September 1955 with the N. B. Hunt interests of Dallas, Texas. The same division of expense and production between the government and the exploring company was announced, with the government's investment limited to $5,250,000 under each of the 12 agreements.



On May 26, 1956 an agreement was signed with Shell Co. of Pakistan Ltd., covering exploration of about 10,000 square miles in West Pakistan and an equal amount in East Pakistan. Petroleum Development of Pakistan Ltd. will be wholly owned by private Pakistan capital, and will hold 25% of the shares.

Production

Production during 1956 averaged 5,700 b/d, It is derived from four fields, of which the largest, Bakkassar, supplies in excess of two-thirds of the total.

Production from Bakkassar is from around 8,000 ft. There are about 6 flowing wells in the field, producing 26 API gravity crude from the Eocene. The other fields are Dhulian, discovered in 1937; Joyamair, discovered in 1944; and Khaur, now nearly depleted since its discovery in 1915. Crude production from the latter three is of 35, 22, and 37 API gravity, respectively.

Transportation

There are no crude pipelines of importance in the country. Sui gas line is 348 miles long, 16 in. in diameter, and has a capacity of 110 million cubic feet daily. It was constructed by Sui Gas Transmission Co. Ltd., which is owned 30% by the government's Industrial Development Corp., and 70% by Burmah Oil Co. Ltd., which will manage the line. A second line is to be built to Multan in the Punjab region. This line is wholly sponsored by the government's Industrial Development Corp.

Refining

There is only one refinery in Pakistan—located at Rawahlpindi, in the Punjab. Capacity is 5,000 b/d, with 1,500 b/d of cracking capacity. The operator is the Attock Oil Co.

Exploration and exploitation concessionaires may refine in the country, and the recent Hunt agreements carry a provision that, if production is found, the company will consider erection of a refinery in Pakistan.

Marketing

Only about 20% of domestic consumption is produced locally; the remainder is imported. Consumption levels at present are averaging around 30,000 b/d, of which the largest segment is fuel oil.

Domestic prices are high. The price of regular gasoline was formerly nearly $1.00 per gallon; it since has been reduced by about 15 cents because of lower import duties.

OIL LAWS

Petroleum in Pakistan currently is subject to the Pakistan Petroleum (Production) Rules, 1949. There are no known privately owned rights to the subsoil. However, in some of the lesser known sultanates which comprise Pakistan, the question has not been determined.

Petroleum operations are divided into three stages: the oil exploration license, oil prospecting license (corresponding generally to the exploration concession), and the oil mining lease.

The government's supervision is through a "director of petroleum" within the Industries Division of the Ministry of Education and Industries.

In order to qualify for oil rights, applying companies must be incorporated in Pakistan, and must make an offer of 30% of their stock or debentures to Pakistan citizens or to the government.

EXPLORATION: Initial exploration, not including exploratory drilling, is done under the oil exploration license. Maximum area per license is 5,000 square miles; minimum is 100 square miles. There is no limitation on the number of exploration licenses which may be held.

The initial duration is three years, extendible once for one year additional.

A minimum annual investment is called for of 5,000 rupees (US $1,050) for every 100 square miles of license area. An annual license fee is payable amounting to an additional 100 rupees (US $21.00) per each 100 miles of license area.

The second phase of exploration is conducted under an oil prospecting license. The maximum area of this license is 1,000 square miles; minimum is 100 square miles. There is no limitation on the number of prospecting licenses which may be received by one company.

Duration of the prospecting license is 4 years, with one renewal of 12 months possible. Similar renewals may be granted, if necessary, to test a group of licenses in a geologically related area, or if a mining lease has been applied for.

Minimum yearly investment is 50,000 rupees (US $10,500) per each 100 square miles of li-

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cense—reducible to half on geologically related areas under 50 square miles. Cumulative expenditure in excess of minimums may be carried forward to following years.

Fiscal obligations of the prospecting license include an annual surface tax or rental of 500 rupees (US $105.00) per license during the original term, and 1,000 rupees (US $210.00) annually during renewals. Royalty on production obtained during the license term and used or sold is payable at rates specified under oil mining leases.

EXPLOITATION: An oil mining lease, containing the right to produce petroleum, is guaranteed to the holder of an oil prospecting license over the same area. A lease may also be received on an additional area outside the area covered by an oil prospecting license, provided it adjoins an area already held by the applicant under lease and does not exceed one-tenth the area thereof.

Maximum area per oil mining lease is 100 square miles, unless special permission is received. There is no limit on the number of leases which may be held by one company. It may contain a clause for 30 years more at the government's discretion. There is no work program prescribed.

No production may be exported until domestic requirements of Pakistan are met. In all phases of oil development, license or lease, Pakistan nationals must be employed and trained at all levels in technical and administrative levels—the number thereof to be determined in consultation with the Director of Petroleum. Holders of an oil mining lease, however, must employ Pakistan nationals as follows: ⅛ of total employees during the first 5 years, ¼ during the next 5 years, and at least ½ thereafter.

The government reserves the right to preempt production in the event of a national emergency or war, with payment at "fair market" price.

Among the fiscal obligations of the lease is a yearly rental of 2,000 rupees (US $420), which is doubled during renewals. A surface rental is assessed of 2,000 rupees per square mile, or the rate payable under the revenue and rent law in the district in which the land is situated, plus water rates under any irrigation rules existing. This surface rental is also doubled during renewals. Depletion allowance is 15% of gross income, up to 50% of net income.

Royalty is 12½% of wellhead value of crude produced and "saved." This pricing system may be replaced at government option to an equivalent charge per 40 gal to be fixed annually. Minimum royalty payable is 8 annas per 40 gal (Imperial), which is equivalent to approximately 12.6 US cents per barrel.

Royalty on natural gas is the same as for crude. On natural gasoline, the royalty is the selling price less cost of manufacture, subject to the same minimum of 8 annas per 40 gal.

Yearly rentals are deductible from royalties. A clause is to be contained in every lease calling for periodic revision of royalties.

A depletion allowance was included in the tax law during May 1956. The amounts are 15% of gross income, up to 50% of net income. Deduction of exploratory and drilling expenses is also permitted.

NATIONAL FACTORS

GOVERNMENT POLICY: The attitude of the government toward foreign capital investment is generally favorable.

Incentives to new investments include an exemption for 5 years from income and supertaxes on profits equivalent to 5% of capital invested; special rapid depreciation allowances on new construction, plant, and machinery; and exemption from taxation of part of capital invested in approved new industries.

Political stability has been achieved since the beginning of independence in 1947, and is estimated to continue with the improved economic situation. There is little communist influence.

There are no expropriations or similar detrimental acts known to have occurred in Pakistan.

EXCHANGE RATES: The rupee has a value of exactly 21 USA cents. This is equivalent to 4.76190 Pakistan rupees per US dollar, and replaced (July 31, 1955) the former value of 3.30852 Pakistan rupees per US dollar.

Private US investment in Pakistan may receive the US government's guarantee against currency inconvertibility and expropriation. This does not apply to production enterprises.

Capital invested in petroleum after September 1, 1954 may be repatriated at any time thereafter to the extent of the original investment in the country from which the investment originated. These repatriation facilities are subject to exchange control regulations.

Any part of the profits derived from investment and ploughed back into approved industrial projects with government approval may be treated as investment for repatriation.

INCOME TAX: The rate of normal tax on corporations is 31.25%. "Supertax" is 25% of total taxable income. Reduction of the supertax to 18.75% is given to "public" companies.

An additional supertax is levied on public companies ranging from 18.75% on companies declaring a dividend between 30% and 40% of their net income to 43.75% on companies declaring dividends in excess of 50% of net income.

The business-profits tax is 16 2/3% on assessable profits. An exemption up to about $21,000 is given from the tax.

LABOR: Total labor force in Pakistan is about 23 million persons. There is little unionization of labor. There are no minimum wage laws. Average wages in the Karachi area range from 77 US cents per day for unskilled manual labor to 90 US cents per day for a semi-skilled machinist and up to US $1.28 for a motor mechanic.

Monthly wages paid to clerical help range from a minimum US $120 to a maximum US $240 for an accountant; $120 to $210 for a research assistant, $60 to $150 for a secretary—down to $22.50 to $37.50 for a watchman. END

PANAMA

Exploration

Exploration has been conducted in Panama at various times since the early 1900's, and has been done by Texas, Sinclair, Gulf, and Cities Service companies.

A recent important exploratory development was the Sinclair contract of 1946. The total area of the concession contract was approximately 18,000,000 acres, including all islands and coastal waters of Panama. Because the contract exploratory period was not extended by the National Assembly for 3 years, Sinclair withdrew in 1949 after having drilled two exploratory wells. The first was on Boca del Toro Island off the Caribbean coast, drilled in 1948. The second was in 1949, on the south side of the isthmus near Puerto Armuelles. Cities Service held an interest in the drilling company, Sinclair Panama Oil Corp.

During early 1956 a concession was applied for by Consolidated American Industries Inc. The area covered is in six blocks covering 1,463,000 acres. They extend to about two-thirds the distance to the Costa Rican border where Union Oil recently made a discovery very close to the frontier, some 21 miles inland.

Consolidated American is an unusual company in that its holdings have all previously been in fields other than oil. It owns the Ace Cabinet Corp., a maker of refrigerated display cases and cabinets, the Atlas Insurance Co., the American Railway Salvage System of Dallas, Texas, and other entities not related to oil.

During August 1956 it was announced that a new concession had been obtained in Panama by Cia. Petrolera del Golfo del Dairen, an affiliate of Commerce Corp., of New York. The area of the concession was stated to be 1.6 million acres in southeastern Panama, including the province of Darien and a section offshore in the Golfo del Darien. A share in the concession was obtained by International Oil and Metals Corp., of San Francisco, Calif., which stated a drilling company was interested in obtaining a share in International's Panamanian operations. A core-drilling program was to begin by International during August 1956.

Other companies known to be exploring in Panama, under surface reconnaissance permit only, are Aluminum Co. of America, Utah Construction Co., New York Honduras and Rosario Mining Co., and Union Oil Co. of California. Union has a contract covering 280,550 acres.

A new company, the Caribbean American Petroleum Corp. of Panama, has been formed by Texas American Oil Corp. of Midland, Texas, to obtain concessions in the country. It is headed by Nash Dowdle. Several locally-organized companies hold large concessions.

Producing, Refining, Marketing

As regards other development of the petroleum industry of Panama, there is no production or refining. All consumption is supplied by imports. Product imports during 1955 were as follows; diesel oil, 266,215 bbl; lubes, 20,882; gasoline, 655,742; kerosine, 152,572. There were also 696,107 bbl of imports listed as crude, which is probably residual fuel oil.

Panama received its biggest refining impetus to date with the announcement that two new plants are contemplated. Panama Refining and Petrochemical Co. reported that Colon had been selected as the site for a $33 million refinery. Planned capacity of the plant was stated to be 55,000 b/d. The first seven years' production is reported by the company to have been sold already to major oil companies which will supply crude from Venezuela and Colombia. The plant will include a $11 million anhydrous-ammonia unit.

A second refinery was announced during June 1956, by Refineria Panama SA, an affiliate of National Bulk Carriers, headed by D. K. Ludwig, of New York. Capacity of this plant is also to be in excess of 50,000 b/d, according to the company, and it will also be located on the Atlantic coast of Panama, near Colon.

Both the refineries are to be built under identical 25-year agreements with the government. Each company is authorized to build a $22 million oil refinery plus a $11 million petrochemical plant. Each agrees to build a pier which will accommodate tankers of 28-ft draft. Import duty on oil is 1 cent per barrel, with an advance duty of $200,000 payable when the contracts were signed, plus a bond of $500,000 to guarantee construction within 2½ years. Each company is to grant 20 scholarships to Panamanians for specialized study abroad in connection with oil refining. The government gave a 370-acre tract to both, with a 25-year lease at a nominal fee. The companies were exempted from import duties on construction materials and equipment.

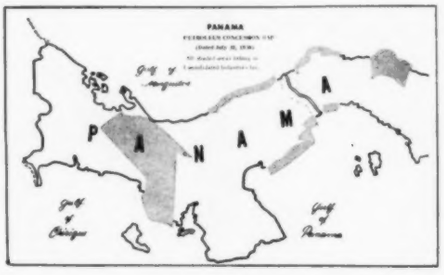
OIL LAWS

On February 24, 1953 Law No. 19 was passed, which governs exploration and exploitation of petroleum at present. The provisions of this law are very similar to those of the Sinclair contract previously mentioned.

EXPLORATION: The initial exploration period is set at three years, with no extensions possible. The maximum area per permit is 2,500 hectares (6,177 acres). Annual exploration tax is balboas 0.15 per hectare (6 US cents per acre, approximately). Areas up to an aggregate of 1,500,000 hectares (3,705,000 acres) may be explored free of tax if: (a) exploration begins within 90 days following the issuance of the exploration; (b) a detailed report is given semi-annually to the government on work performed; (c) one well must be drilled within the 3-year period to 500 meters (approximately 1,500 ft) or to a producing stratum; and (d) areas desired for future work must be designated before permit expiration.

EXPLOITATION: Conversion of the exploration permit to exploitation right does not appear to be guaranteed in the law; however, preference is given in the granting of the exploitation concession to persons who have performed exploratory work. The duration of the exploitation concession or "lease," as it is referred to in the law, is 20 years, with possible renewals of 20 years' duration subject to the laws then in force. The holder of the lease must meet a drilling obligation of 500 meters within 5 years for each 10,000 hectares (24,710 acres) contracted.

Fiscal obligations of the lease include a royalty of 16 2/3% of gross production, after deduction of waste. An annual rent of balboas 0.15 per hectare is payable on area up to 50,000 hectares and balboas 0.10 per hectare on additional area. Transfer of the lease is possible only with government permission.



NATIONAL FACTORS

Politically, the most important aspect of Panama's history has been her association with the United States, which began with the US-Panama treaty of 1903. This treaty was replaced in 1936 and, in turn, that was replaced on January 10, 1955 by a new treaty which increased canal payments by the United States, gave Panamanians equal pay with US citizens in the Canal Zone jobs, and put Panamanian concerns on an equal footing with US companies in contract bidding in the Canal Zone. The United States is given the rights to the Canal Zone and, presumably, the right to defend it in any way necessary.

Foreign companies are accorded the same treatment as Panamanian except for limitation of retail commerce to certain categories of persons, principally Panamanian nationals. This parity of treatment extends to mining and subsoil concessions. There is no limitation on stock ownership or formation of a domestic corporation by foreigners. There is no capital or dividend tax. The rate of income tax payable by corporations rises from 2% on income between 900 and 2,400 balboas to 34% on income in excess of 1,000,000 balboas. There is an additional 4% social-security insurance tax payable by the employer on wages of each employee. For all types of income other than earned income, a 20% surcharge on the regular tax is payable, although this may be reduced to 10% at the discretion of the tax authorities.

Corporations organized in Panama and conducting business outside the country are not subject to tax. Special treatment is afforded new foreign and domestic investment. This special treatment includes exemption from other minor taxes such as stamp and consumption taxes, and exemption from import duties.

There is no exchange control, and no limitation on the amount of dollar exchange which may be remitted in the form of profits, amortization of capital, etc. The balboa is exactly equivalent to the USA dollar in value. USA currency circulates freely in Panama. New foreign and domestic investments in extractive and manufacturing industries and agriculture (not including retail trade) are given substantial encouragement for a period of 25 years. Some aspects include: exemption from import and export duties; exemption of foreign experts and technicians from the Labor Code; exemption from all consumption, production, and operation taxes except the income tax; and guarantee of exemption from income tax on profits earned outside the republic.

The new Labor Code of 1947 is generally conservative. It provides for an 8-hour day 48 hours per week, with 42 hours for night work. Overtime is payable at time and a quarter for daytime, time and a half for night work. Minimum wages are fixed by the government, and equal pay must be given to all nationalities. Of the labor force 75%, as well as 75% of the payroll, must go to Panamanians, with technicians and experts necessary to operations exempted from this rule. END

PAPUA

Exploration

Exploratory work in Papua began about 1919, when the Anglo-Persian Oil Co. (supported equally by the British and Australian governments) began work on the Gulf Coast region of Papua, southward to Yole Island. By 1926 two wells had been abandoned; and a third, Popo No. 3, had reached its horizon objective. Two more wells, Popo No. 4 and 5, were drilled and abandoned by 1929 when, after the completion of another geological survey, principally in the mandated territory, operations ceased.

In 1937 some additional interest was displayed in Papua by Oil Search Ltd. and Oriomo Oil Ltd. (Royal Dutch-Shell group). A fifth company, Papuan Apinaipi Petroleum Co. Ltd., acquired about 48,000 acres in 1937 between the Popo district and Cape possessions.

At present there are three companies exploring in Papua. The first is Island Exploration Co., owned 45% each by British Petroleum (formerly Anglo-Iranian) and Vacuum Oil Co., and 10% by Oil Search Ltd. It is under the same management as the second company, Australasian Petroleum Co. Pty. Ltd., which is held by the same companies in 40-40-20 ownership. The third company in Papua. Papuan Apinaipi Petroleum Co., is an independent company which holds an exploration concession covering some 8,600 square miles northwest of Port Moresby. To date no oil discoveries have resulted from the efforts of any of these companies.

The most active company in exploration is Australasian Petroleum, which has drilled a series of wells and conducted an active exploratory campaign in southwestern Papua. During 1954 this company drilled a deep test, Omanti No. 1, and began another, Omanti No. 2, both on the Darai anticline, plus putting in 26 party-months of geophysical effort. One gravity crew was in the field during 1954. During 1955 Omanti No. 2 turned out dry at 10,880 ft and the rig was moved to another well, Aramia No. 1, also dry in September 1955 at 6,614 ft. A new test, Kuru No. 1, near the border of Netherlands New Guinea, at the end of 1955 discovered some natural gas.

Kuru No. 2, a wildcat by Australasian Pty. Ltd., cemented casing to 563 ft in July 1956. This well is a replacement for Kuru No. 1, which had a gas blowout at 998 ft. Another rig was set up at Barikewa, near Kuru, during mid-August 1956.

During 1957 The Australian Petroleum and Island Exploration companies plan to spend about £4.5 million, compared with about £3.5 million in 1956. This will bring their cumulative expenditure to about £24 million, or $53.7 million. The companies plan wildcats at Kuru, Barikewa, Morehead, and Komewu.

Production, Refining, Marketing

There is no production nor refining in Papua. Figures on consumption of petroleum products in the territory are not available.

OIL LAWS

Under Petroleum (Prospecting and Mining) Ordinance of 1938 (No. 13), as amended by Petroleum (Prospecting and Mining) Ordinance, 1939, No. 2, and Ordinance No. 14 of 1939, as amended in 1947, operations for exploration and exploitation are divided into 3 stages: prospection permit, exploration license, and exploitation lease. Under the first may be performed reconnaissance work for a period of 12 months. This term may be extended for 3-year periods up to a total of 14 years on approval by the ministry.

The area of the permit is limited to 6,400 000 acres, divisible into a maximum of 3 areas. Only one permit may be held by one individual or company. There is an application fee of £100 ($224.00) but no other tax or rental.

EXPLORATION: Exploration license includes the right to all necessary operations, including drilling. Area is 2,500 square miles (1,600,000 acres) maximum, divisible into one or more blocks of one-fifth the total area each.

The original term is two years, but this may be extended by the lieutenant governor for a total duration of six years.

In the event of discovery, the licensee must carry out "such operations" as are necessary for proving the well. The license may be surrendered at any time, either in whole or in part, on two months' notice after the first year has elapsed.

The exploration license is subject to an application fee of 20 pounds ($45) and a granting fee of 25 pounds ($66), the latter applicable on first year's rent if license is granted. A bond is to be furnished of not less than 5.000 pounds ($11,200) as required by the lieutenant governor. An annual rental is assessed beginning with one shilling (11 US cents) per square mile during the first year, rising one shilling per year until the sixth, when it rises to 10 shillings ($1.10) per square mile.

EXPLOITATION: The exploitation "lease" application must be made to the lieutenant governor.

A bond must be furnished of not less than 10,000 pounds ($22,400). The total area per person or company may not exceed 320,000 acres, whether in one or more areas.

Lease duration is 21 years, but it may be renewed for successive terms of 21 years. A drilling rig must be installed within six months, and drilling begun. A well drilled under the exploration license may satisfy this requirement. The lease may be surrendered in whole or in part on six months' notice, provided all rentals and royalties are paid and wells made safe.

An annual rental is payable of 5 pounds ($11) per square mile during the first through the fifth years, 10 pounds ($22.40) per square mile during the sixth through the tenth years, and 15 pounds ($33) per square mile each year thereafter. A royalty of 10% is payable on the gross value at the wellhead of crude, natural gasoline, and natural gas—after deduction of hydrocarbons lost, returned to reservoir, used in operations, or natural gas not sold.

TABLE I

RESULTS OF EXPLORATION WELLS IN PAPUA

Omanti 1*	Island Exploration	14,352	High-pressure, non-commercial gas show at 13,740 ft. Abandoned.
Omanti 2*	Island Exploration	10,880	Dry.
Aramia 1	Island Exploration	6,628	Dry in granite basement.

*Omanti No. 1 was spudded November 22, 1950.
Omanti No. 2 was spudded April 17, 1954.

NATIONAL FACTORS

Papua is governed by the Papua and New Guinea act of 1949, which placed New Guinea and Papua under a single administration. It remains a possession of the crown, placed under the commonwealth of Australia; and the commonwealth retains full legislative power over Papua under Sect. 122 of the commonwealth constitution. Regulatory officers for the petroleum industry are the Oil Advisory Committee, composed of three persons appointed by the minister.

Papua comprises the southeastern part of the island of New Guinea. Total area is 90,540 square miles.

Taxation for corporations is 30% on the first 5,000 Australian pounds ($11,000) and 35% in excess of 5,000 Australian pounds for all public companies. For purposes of tax, the statement has been made by authorities that oil companies will be treated as public companies. On private companies, the rate is 20% on the first 5.000 Australian pounds, and 30% in excess of 5,000 Australian pounds. There is an additional tax on private companies of 50% on taxable income not distributed to shareholders; 50% of the first 1,000 Australian pounds undistributed income may be retained as reserves, declining to 25% of the excess over 4,000 Australian pounds which is not subject to the undistributed income tax.

A dividend tax of 35% is imposed on dividends received by resident companies. American companies are not subject to this tax on operations of a branch; however, a subsidiary pays the regular income tax plus a dividend tax of 15%. All nonresidents pay the 35% tax on interest and royalties received; therefore, a US subsidiary would pay the corporation profits tax of 35% and a 35% tax on any interest payments to the parent company. There is a treaty for the avoidance of double taxation now in force with the United States.

Exchange control is the same as for the Australian pound as a whole. No oil rights are grantable to citizens or companies from a country which denies reciprocal privileges to British citizens or companies. END

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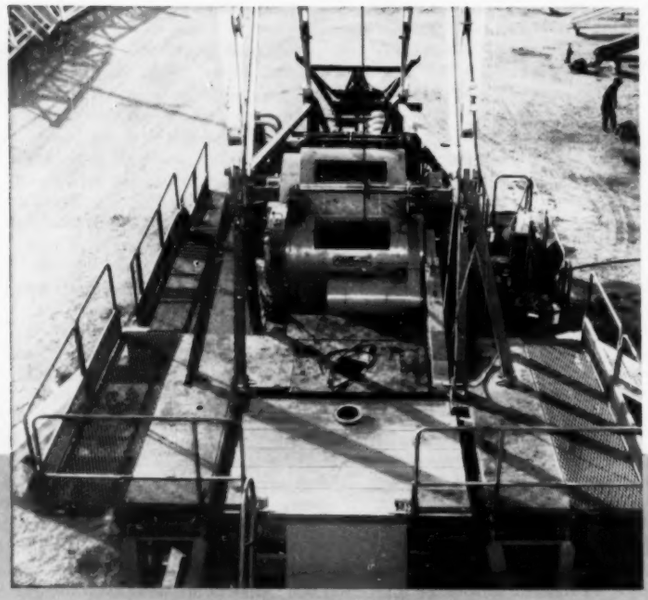

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PERU

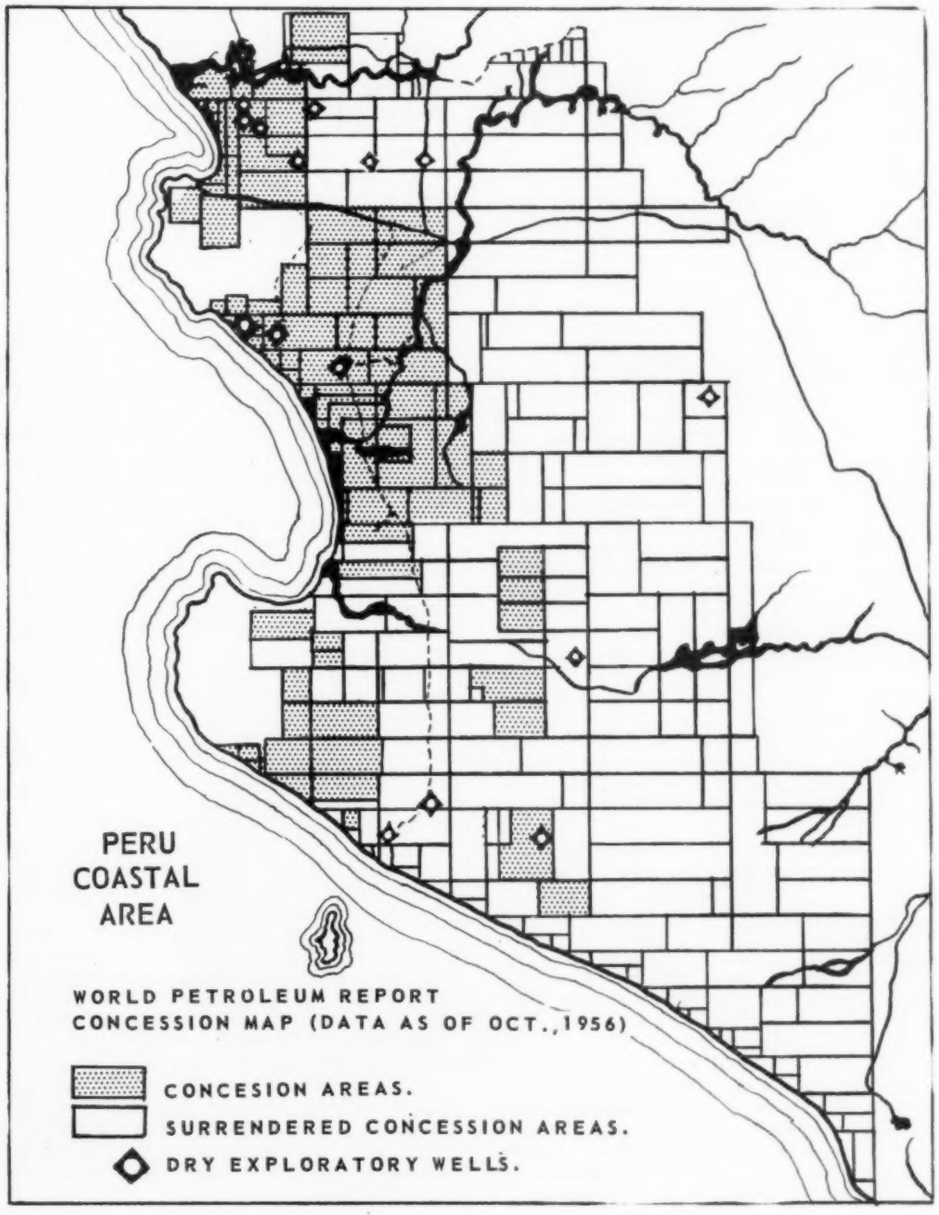
Exploration

The Peruvian petroleum industry is the oldest in South America. Exploration, which first began on a modern scale with the La Mina Brea Co. in 1889, developed when the estate was bought in fee by International Petroleum Co. (IPC), a Canadian affiliate of Standard Oil Co. (New Jersey) about 1915. Other companies had explored earlier, including the British company, Cia. Petrolera Lobitos mentioned later, but intensive activity only began in 1952 when the present petroleum law liberalized industry regulation.

Beginning in 1952, many millions of acres were taken by companies, principally in the coastal area where production is concentrated at present. The exploratory results were disappointing in the area, especially in the Sechura desert where some 16 exploratory wells drilled failed to find important production. Main interest has shifted to the Montana region, comprising the eastern slopes of the Andes mountains and the edge of the Amazon basin. Despite extremely difficult operating conditions, 3 wildcats were drilled in the area during 1955—all dry. One was suspended at 9,787 ft by The Texas Co. on the Maranon River; another was abandoned by Ganso Azul Petroleum Co. (an American firm) at 1,305 ft in the Ucayali River valley; and a third, Cashiboya No. 1, was abandoned because of mechanical difficulties at 3,934 ft by Cia. Peruana de Petroleo "El Oriente," a Peruvian-owned firm.

Eleven companies, with the legal acreage limit in the Montana as fixed by Law No. 12376 of July 9, 1955, received additional acreage totaling 937,958 acres in 1956. They include Cerro de Pasco Corp., Cia. Peruana de Petroleo "El Oriente," International Petroleum Co., Mobil Oil del Peru, The Texas Co., and others.

Geological studies are being made of Peru's offshore sediments at present. During December 1956 the government began awards of offshore concessions; maximum area per company was set at 248,550 acres, with preference for 60 days to Peruvian companies.



Production

International Petroleum Co. Ltd. and La Compania Petrolera Lobitos (subsidiary of Lobitos Oilfields Ltd., a British company) account for virtually all of the country's production.

Lobitos operates the Lobitos and Restin-El Alto fields just north of International's properties, and in 1955 produced 4,964,039 bbl. The two companies have undertaken joint operations in a small area on the boundary of the Lobitos field and at another point between the Lobitos and El Alto fields. Total production from these joint operations, however, is no more than 2,000 b/d to 3,000 b/d.

Empresa Petrolera Fiscal, a state-owned company, has operated the Zorritos field since 1939. Its production of crude has grown from 121,151 bbl in 1949 to 592,384 bbl in 1955.

The concession of Ganso Azul—a company owned 80% by Texas Gulf Producing Co. with the Kendall Refining Co. and Bay Refining Corp. each holding 10%—is in the central part of the Oriente area on the Ucayali River near Pucallpa.

The 17 wells completed are insufficient to support the cost of construction of a pipeline across the Andes (estimated to cost $75 million to $100 million) but considerably higher than requirements in the Oriente area. Annual output of crude of this company amounted to 262,413 bbl in 1955. Three other companies producing in Peru are located in the Sechura area. They are Petrolera Peruana, Peruvian Pacific, and Douglas Oil Co. They produced 71,529; 19,261; and 16,190 bbl. respectively, during 1955.

Refining

International Petroleum Co. operates a modern refinery at Talara which meets Peru's domestic oil requirements in full (except for specialty products) and which also produces surplus quantities for export. The plant's crude charging capacity is now on the order of 45,000 b/d, and its thermal cracking unit has a capacity of about 14,000 b/d. Empresa Petrolera Fiscal and Ganso Azul maintain small topping plants, viz., the Villar refinery and the Iquitos refinery, with a capacity of approximately 1,500 b/d and 1,200 b/d, respectively. Produced during the year were 1,859,000 bbl kerosine; 1,620,000 distillate fuel oil; and 67,000 lubricating oils. Refinery runs during 1955 were 47,200 b/d. Runs were 33,910 b/d in June 1956.

Domestic consumption of the 5 major products during 1955 was 34,931 b/d, or 12,749,930 bbl total, compared with 5,701,512 bbl in 1948. Demand in 1955 was composed of 3,979,472 bbl residual fuel oil, most of which went to the mining companies in Peru; 4,419,902, motor gasoline; 1,760,863, kerosine; 2,020,943, diesel oil; 275,603, aviation gasoline; 69,930, lubricants;

TABLE I
PERUVIAN RUNS TO STILLS, JUNE 1956
(Barrels)

International	968,720
Ganso Azul	22,248
Empresa	—
Compania Petrolera	246,728
Total	1,237,716

45,055, LPGas; and 443, other products. Consumption in 1960 is estimated to rise to 48,760 b/d.

The increase in domestic oil requirements has made sharp inroads on the quantities of crude oil available for export, while refined-products exports are somewhat higher than they were in 1938. March 1956 crude exports were down to 5,145 b/d. Products exports were 9,668 b/d.

In the postwar period Latin America has become virtually the sole oil market, except for some crude-oil shipments to the United Kingdom which are processed in the refinery of Lobitos Oilfields Ltd., the parent company of La Compania Petrolera Lobitos. Uruguay and Argentina absorb the crude-oil shipments to Latin America, whereas the bulk of finished products is sent to Colombia and Chile.

Petroleum prices within Peru are among the lowest in the world, due to government controls. By decree of September 20, 1954, prices were set at 2.30 soles (about 11.9 US cents) per gallon for high-test gasoline, and 1.90 soles for regular-grade. Kerosine was priced at 0.95 soles per gallon; diesel fuel, at 1.05; and residual fuel oil, at 0.80.

Imports during 1955 were 1,255,400 bbl of residual fuel oil, mostly by IPC, plus some special lubricants which cannot be produced by domestic refineries. The prices of imports contrast sharply with domestic prices, showing (in soles) 3.35 for imported regular-grade gasoline, 2.30 for kerosine, and 2.20 for diesel.

OIL LAWS

The governing petroleum law is Law 11780 of March 12, 1952 and regulations thereto of Supreme Decree No. 1 of June 10, 1952, with Law of July 8, 1955 (No. 12376).

For the purposes of the law, Peru is divided into four zones: the Coastal, in the west; the Sierra, in the mountains; the Offshore; and the Oriente or Montana in the east.

Companies organized in Peru with foreign capital must offer at least 30% of their share capital to Peruvians. Foreign companies may not own concessions within 50 km of the country's frontiers, except by special law.

EXPLORATION: Exploration concessions have a duration of three years in the Coastal zone, five in the Sierra, and six in the Montana. Two extensions may be granted, for one year each in the Coastal zone and two years each in the Sierra and the Montana.

Maximum area per concession is 20,000 hectares (49,420 acres) in the Coastal and Sierra zones, and 5,000 hectares (123,550 acres) in the Montana zone. A single concessionaire may not obtain more than 20 concessions in any one zone. However, additional concessions may be obtained through auctions, with 10 more concessions being granted per concessionaire in the Coastal zone and 20 in each of the two other zones during each auction.

TABLE II—WELLS COMPLETED IN PERU, 1955

	Oil	Gas	Dry	Total	% Successful
Exploratory tests	7	1	16	24	33
Development wells	130	3	34	167	80
Total	137	4	50	191	74

TABLE III—PERUVIAN CRUDE PRODUCTION—1956
(Thousands of Barrels Per Day)

January	44.5	July	50.3*
February	50.3	August	50.1*
March	50.2	September	51.0*
April	50.2*	October	51.1*
May	50.4*	November	50.1*
June	50.4*	December	50.3*
		Year	49.9*

*Estimate.

Applicants for concessions must deposit a guaranty per hectare of six soles in the Coastal zone, four soles in the Sierra, and two soles in the Montana. Minimum annual investment throughout the exploratory period is 15 soles per hectare in the Coastal and Sierra zones, and 2.50 soles in the Montana.

Annual surface tax is two soles in the Coastal zone. During the first extension, the tax amount is four soles—rising to six soles during the second extension. Rates in the Sierra and Montana regions are one-half and one-fourth of Coastal zone rates, respectively.

EXPLOITATION: Exploitation concessions are received either directly or from exploration concessions. Exploitation concessions have a 40-year duration in the Coastal zone, 45-year in the Sierra, and 50-year in the Eastern or Montana. One extension may be received of 20 years in the Coastal zone, and 25 years in the Sierra and Eastern.

Maximum size of each direct exploitation concession is 10,000 hectares in the Coastal and Sierra zones, and 25,000 hectares in the Montana zone. No concessionaire may hold more than 10 concessions in any of the 3 zones, with the exception of acreage obtained through auctions (exclusive of acreage obtained through conversion of exploration concessions to exploitation parcels). No company is qualified to participate in auctions for concessions in the Montana zone unless it already holds at least one million acres.

The right of exploitation concessionaires to export any oil discovered is contingent upon the satisfaction of domestic oil requirements at prices fixed by the government—the concessionaire obliged to supply the local market on a pro-rata basis.

Surface rates per hectare in the Coastal zone are 10 soles in the first through fifth year (about 21 US cents per acre), 30 soles in the sixth through tenth year (about 63.1 US cents per acre), 80 soles in the 11th through 15th year (about US $1.68 per acre), and 100 soles in the 16th through 20th year (about US $2.10 per acre). In the following years these decline to 80 soles in the 21st to 25th year, 40 soles in the 26th through 30th year, and 30 soles in the 31st through 40th year. Rates in the Sierra and Montana zones are one-half and one-fourth of these, respectively.

The surface tax is reduced after the first five years for every two metric tons of production per hectare obtained from any group of concessions covered by the same title (i.e., concessions applied for at the same time). It is reduced by 10 soles in the Coastal zone, 5 soles in the Sierra, and 2.50 soles in the Montana—but not below the fee payable during the first 5 years of exploitation.

The bonus or "initial exploitation tax" amounts to 30 soles per hectare in the Coastal zone, 15 soles per hectare in the Sierra, and 7.50 soles per hectare in the Montana. If the exploitation concession is extended at the end of the original concession period, the owner is required to pay another bonus double the original one.

A basic export tax is assessed of 20% of the f.o.b. value of crude oil or refined-products exports for oil produced in the Coastal zone. Exports from the Sierra and Montana zones will pay at the rate of 3% during the first 10 years of the concession, 5% in the second 10-year period, 7% during the next 10 years, and at 10% thereafter. The tax is payable in kind or in soles. In case actual shipments are made to the United States or a country whose currency is freely convertible into dollars, the government may require payment in dollars for such shipments. Export taxes are each 1% ad valorem on crude-oil and refined-products exports.

A special income tax on petroleum amounts to 50%, immediately, of net profits in the Coastal zone. In the Sierra and Montana zones, it does not rise to that level until the 41st year of the exploitation period, amounting to 10%, 25%, and 35% in the first 3 decades of the period, respectively. The industry may deduct 20% profits tax, and it may amortize the exploitation bonus over the period of the exploitation concession. The two minor export taxes and import duties are not deductible.

Depletion allowance in the Coastal zone is 15% of the total gross value of production. In the case of national companies (those in which Peruvians hold at least 60% of the capital stock and where the board of directors is composed two-thirds of Peruvian nationals) the depletion allowance in the Coastal zone is 25% of the gross value of crude-oil production. It may not exceed 50% of net profits after the deduction of the 20% profits tax and the depletion factor. In the Sierra and Montana zones, the allowance is 27.5% of the gross value of production, limited to 50% of the net profits before deduction of depletion rather than after, as in the Coastal zone. The 20% export tax is deductible from gross profits. Surface fees paid during the exploration period and the exploitation bonus are not deductible.

Concessionaires may deduct depreciation as well as overhead, including that incurred abroad; and may amortize capitalized assets and set aside reserves for normal future expenses. Exploration expenses and investments, including productive wells and installations, may be capitalized and amortized over their probable useful life. The cost of dry holes is considered part of producing costs, and may be capitalized.

Concessionaires are not subject to import duties on materials which are re-exported within two years after entry into the Coastal zone. Drilling and other equipment used in exploration and production in the Sierra and Montana zones is subject to only 50% of the duty in effect at the time of importation. The law exempts remittances abroad of profits earned from oil operations from any form of transfer tax which may be enacted in the future.

TRANSPORTATION, REFINING, AND STORAGE: Concessions for pipelines, refineries, and storage facilities may be obtained for a period of 40 years, and may be extended another 40 years upon application of the concessionaire.

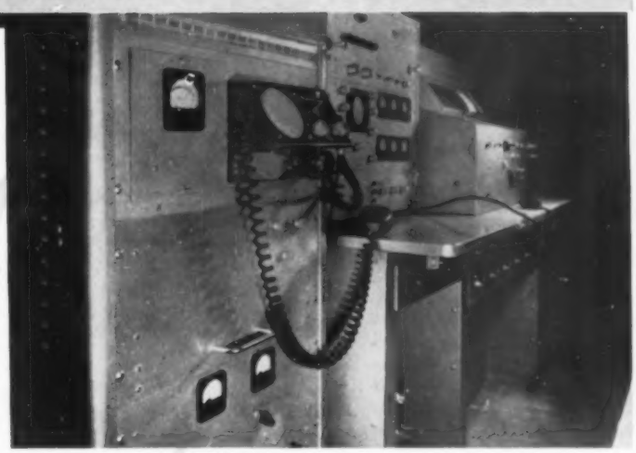
Peruvian topography in the east is an impediment to exploration, and a petroleum discovery would have to be of major importance to justify the construction of a pipeline across the Andes to the coast. Transportation facilities are generally inadequate.

The political situation has been fairly turbulent, but no upheavals have occurred which fundamentally affect investment.

The general economy is prosperous, based on the four commodity mainstays of Peru: cotton, sugar, petroleum, and copper. The unit of currency, the sole, is worth about 19.58 to the dollar (as of the February 1956 free rate). There is no restriction on the import or export of capital, and all profits and amortization for depreciation, etc., may, without approval, be freely remitted abroad in the free market.

Labor in Peru plays little part in politics, since it was affiliated with the now-outlawed APRA party. Strikes are rare, and there is a considerable volume of trained petroleum labor available. Wage levels are considerably below USA levels, averaging around $2.20 per day for skilled labor. Labor legislation is extensive, and includes a provision that 80% of personnel and payroll must be Peruvian, with exceptions for irreplaceable managers and technical assistance. Work week is 48 hours, and a profits-sharing scheme is compulsory. Other requirements are not burdensome. END

What on Earth?



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PHILIPPINES

Exploration

Exploration in the Philippines began in the early part of the 20th century, with the registration of many small claims which were not strictly concessions but patent rights. Of these early claims, only three remain. They are located on the Bondoc peninsula, municipality of San Narisco, and issued to a Mr. Maglihi, known as Maglihi No. 1, 2, and 3.

At present there are seven exploring companies. Caltex (Philippines) is jointly owned by The Texas Co. and Standard Oil Co. of California, both of which have separately acquired substantial concessions. Standard Vacuum Oil Co. is jointly owned by Standard Oil Co. (New Jersey) and Socony Mobil Oil Co. It planned an exploratory well in 1957. An independent American company, San Jose Oil, also holds concessions.

Two other exploring companies are backed by local Philippine capital. Philippine Oil Development Co. (Phodco), owned by Andres Soriano, initiated drilling operations (in which Caltex has a 50% interest) during October 1955 in the Cagayan valley of northern Luzon island. Under its former name of Far East Oil Co., it drilled two wells previously in the Daan-Bantayan area.

The well by Phodco, Tumauini No. 1, is located on the Tumauini anticline. It found shows of oil at 3,690 ft and 4,000 ft, and farther down encountered considerable quantities of natural gas. However, it was considered off-structure, and abandoned at 10,414 ft. The Cagayan valley basin is about 43 miles wide and 136 miles long, and comprises a sedimentary area mainly of Pliocene and Miocene age, in which there are at least 13 anticlines varying in length from 5 miles to 26 miles. A number of oil seepages occur in the area. A second well was scheduled by Phodco, about 3 miles west, for completion in 1957.

An agreement recently was signed between Phodco, and Texas and Standard of California, under which the US companies have the option, if an ail field is found by Phodco, jointly to acquire a 50% interest in any production from the Phodco concessions and in return to contribute 75% of the development expenses of the producing field and also 50% of the development expenses of other Phodco concessions. The two companies contributed to the cost of drilling Phodco's dry test well.

In central Luzon, Phodco and the US-owned San Jose Oil Co. put in overlapping claims for an area of 270,000 hectares, which now has been equally divided between the 2 companies, each having an option to a half share in production and development of the other's section. Concessions are also held in the Philippines by the Acoje Mining Co. (in Cebu), the Luzon Stevedoring Co. (in Leyte), and the Philex Mining Corp. (Luzon)—all local concerns.

A conflict over concession rights in Cagayan valley between Phodco and Standard Vacuum was resolved in 1955—with one-third given outright to Phodco. The remaining area was divided equally by Phodco and Standard Vacuum, subject to each company's option of receiving one-third of production the other might obtain from its area on payment of one-third the expenses incurred in developing such production.

Production

There was a total of 99 registered discoveries as of the end of 1953, but none of these was a commercial producer.

Refining

The only refinery in the Philippines is the recently constructed Caltex refinery on Batangas Bay in southern Luzon, about 72 miles south of Manila. It is owned by Caltex (Philippines) Inc. It has a capacity per stream-day of 13,000 bbl, with 5,400 bbl daily catalytic cracking capacity. There is, in addition, 565 b/d capacity in phosphoric-acid catalytic polymerization and a propane decarbonizing unit.

Oil companies are pressing for some modifications of the oil law which gives the government the right to insist on the holder of a concession's building a refinery when production is in excess of 10,000 b/d. This provision is now outmoded by the fact that Caltex already has a refinery at Batangas Bay, whereas Standard Vacuum is engaged in discussions with the government for the erection of a 21,000 b/d refinery. The Royal Dutch-Shell group is also considering the building of a refinery. If these additional refineries materialize, the Philippines will have more than sufficient refining capacity to meet local consumption.

Marketing

Total consumption within the Philippines amounted to 32,200 b/d during 1955. It increased to an estimated 39,000 b/d during 1956. For 1960, consumption is estimated at 52,080 b/d.

The contribution of petroleum to government revenue during 1950 amounted to 16%, mostly from the special tax of 7 centavos per liter for highways and bridges.

OIL LAWS

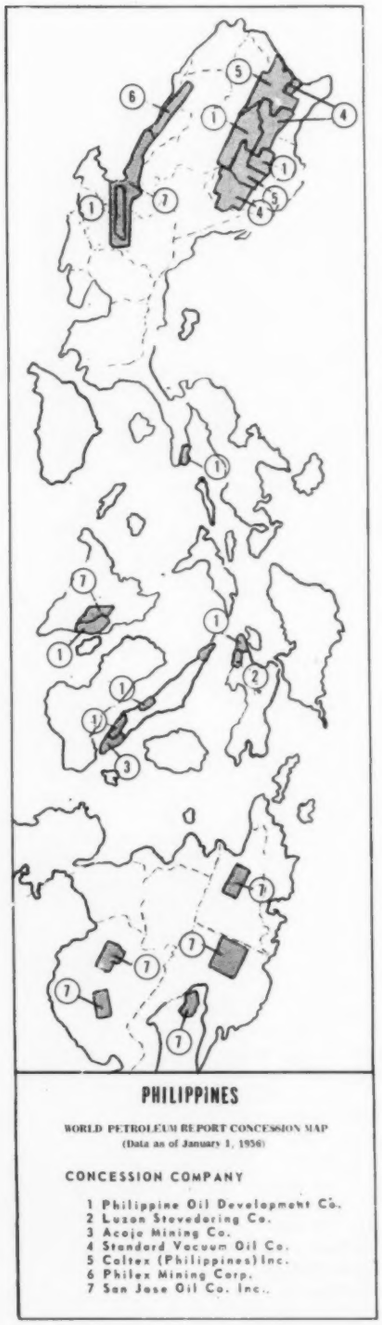
The Constitution of 1935 limits development of petroleum to Filipinos or to corporations having at least 60% Philippine capital. By special agreement of 1955, however, citizens of the United States may participate on the same basis as Filipinos.

Administration of petroleum affairs is by the Ministry of Agriculture and Natural Resources, through the Director of Mines.

The governing law is Republic Act 387 of June 18, 1949, known as the Petroleum Act of 1949.

EXPLORATION: The first exploration right is a nonexclusive permit under which surface geological and/or geophysical work may be performed, but no drilling. Initial duration is two years, renewable once for two years more, at government discretion.

The exploration concession includes exploratory drilling rights. Maximum area per concession is 100,000 hectares (247,104 acres); minimum is 20,000 hectares (49,400 acres). The maximum acreage which may be held by one person or entity is 1,000,000 hectares (2,472,040 acres), of which not more than 500,000 hectares may be in one petroleum district. There are no restricted areas on which concessions may not be granted, except those already covered


PHILIPPINES
WORLD PETROLEUM REPORT CONCESSION MAP
(Data as of January 1, 1956)
CONCESSION COMPANY
1 Philippine Oil Development Co.
2 Luzon Stevedoring Co.
3 Acoje Mining Co.
4 Standard Vacuum Oil Co.
5 Caltex (Philippines) Inc.
6 Philex Mining Corp.
7 San Jose Oil Co. Inc.

by other concessions previously granted.

The original term of the exploration concession is four years. This may be extended twice at the discretion of the government for a three-year period each time.

All or part of the concession may be surrendered at any time by the concessionaire.

Obligatory expenditure per hectare of concession area is 50 centavos during the third year, and 2 pesos during the fourth. During the fifth through the seventh year, if the concession is extended, the yearly expenditure must be 2 pesos 50 centavos per hectare; and during the eighth through the tenth year, 3 pesos per hectare per year.

Annual surface tax is 5 centavos per hectare (one USA cent per acre, approximately) during the first year; 7½ centavos during the second and third years; 10 centavos per hectare during the fourth year. During the first extension, if granted, the tax remains at 10 centavos per hectare. During the second extension, the eighth through the tenth year, the annual tax rises to 12.5 centavos per hectare, or approximately 2.5 USA cents per acre yearly. Of this tax, 10% is paid by the government to the landowner, proportionately to the amount he owns.

The only other fiscal levy is an initial application tax of 1,000 pesos ($500), returnable if the concession is not granted. A bond guaranteeing performance must be posted; the amount thereof is not specified.

The concessionaire is given a complete exemption from customs duties on all imports of all equipment, machinery, materials, supplies, and accessories. He is also guaranteed freedom from any export tax on production which may be obtained.

The work obligations, taxes, and royalties are not subject to change during the life of the concession.

For administrative purposes, the country is divided into 6 petroleum regions; Cagayan valley (No. 1); Central valley (No. 2); Palawan-Mendora (No. 3); western Visayan region (No. 4); eastern Visayan region (No. 5); and Minandao-Sulu (No. 6). The lands which formerly were covered by concessions (and the excess of concessions found to be over legal size) are considered part of the "national reserves," subject to special terms on regranting—including competitive bidding, increased royalty, etc.

EXPLOITATION: The exploitation concession is grantable at any time from the exploration area. It may also be received directly.

The maximum area per concession is 123,000 acres, with a minimum area of 24,710. The maximum total concession area which may be held by one person or entity in several concessions is 1,235,000 acres, of which no more than 617,500 acres may be in one petroleum district.

The initial duration of the exploitation concession is 25 years, renewable for another 25 years.

The concessionaire may renounce all or part of the concession at any time—provided that, if any area is retained, it be at least 24,710 acres.

The concessionaire may be required to refine all or part of production obtained in any refinery of the republic, or to construct a 10,000 b/d refinery when his recoverable petroleum reserves are 140,000,000 bbl or more, capable of producing from his fields 10,000 b/d for 15 years.

Annual exploitation surface tax is ½ peso per hectare during the first 5 years—rising to 1 peso during the 2nd 5 years; 1½ pesos during the 3rd 5-year period; 3 pesos during the 4th 5-year period; 5 pesos during the 5th 5-year period; and 5 pesos per hectare per year thereafter. On private land, 10% of this tax is paid by the government to the landowner.

Royalty is 12% of production, less field use. Natural gas returned to the formation is not subject to royalty. The payment of royalty may be either in cash or in kind. If in kind, oil must be stored 30 days free. If in cash, the value is stated to be the "market value," although this is not defined in the law.

REFINING: The holder of an exploitation concession, or any other qualified person (including a discoverer as mentioned above), is entitled to a refining concession of 25 years' duration, renewable for 25 years.

The concessionaire may renounce his refining concession or traansfer it at any time with prior government approval.

PIPELINE: A nonexclusive 25-year pipeline concession is guaranteed to the exploitation concessionaire. It is renewable for 25 years additional.

NATIONAL FACTORS

The attitude of the Philippine government toward the investment of foreign private capital is favorable as regards United States' investment, but tends to limit that of other nationals. The income tax for corporations is a flat 20% on net income up to 100,000 pesos ($50,000) and 28% in excess of 100,000 pesos. On dividends remitted to a corporation abroad or in the Pilippines, only 25% of the dividend is "returnable for tax purposes" and subject to the regular corporate tax. No depletion allowance is given. Depreciation allowances average about 20% annually for machinery and capital equipment.

By Republic Act 901, complete tax exemption until December 31, 1958 is granted industries established since January 1, 1945. The exemption drops to 90% through 1959, 75% through 1960, 50% through 1961, and 10% through 1962. Refining enterprises do not qualify. Other investments qualifying are those in excess of 200,000 pesos ($100,000), or those contributing to a balance economy of a permanent nature and using domestic materials—with imported raw-material cost not exceeding 60% of manufacturing cost.

The unit of currency is the peso, converted in this report at the rate of two pesos per dollar, which is the rate at which pesos must be purchased for operations. The rate is fixed by basic agreement with the United States. In 1951 a 17% exchange tax was imposed on peso sales by the Central Bank of the Philippines for certain purposes and on remittances abroad, making the effective rate 41.5 USA cents per peso. Materials used by the new and necessary industries are exempted from this tax.

New investments involving remittances abroad require government approval—with more liberal treatment given dollar-earning or dollar-saving enterprises. Investments made prior to 1949 are limited in remittances to 10% of net profits, or 10% of capital. For investments made after 1949, the formula for remittances must be reached in advance. The Central Bank has announced that foreign firms will be allowed to remit from 25% to 100% of their profits and dividends abroad, depending on a system of priority ratings. Firms earning or saving dollars, employing as much domestic labor as possible, utilizing maximum amounts of local raw materials, and consuming as little foreign exchange as possible will be allowed to remit as much as 100% of foreign participation in their net earnings.

Capital invested after 1949 may be repatriated or transferred on application. An MSA* guarantee by the United States of profit remittances and covering expropriation risks is available upon application for USA companies. END

* Mutual Security Administration.

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PORTUGAL

Exploration

The entire area of continental Portugal—excepting two minor areas which are covered by an asphalt concession, Canto de Azeche, and a hydrocarbons concession, Capela de Sismaria—is covered by an exploration concession held by the Companhia dos Petroles de Portugal (CPP). This company is owned on an almost equal basis by the Portuguese government and by Axel Johnson interests, of Sweden. A small number of CPP shares is owned by other private stockholders.

Early in 1955 CPP entered into a contract with the Socony Vacuum Exploration Co. (now Exploration Co. of Portugal Inc.), owned by Socony Mobil Oil Co. The contract is an operating agreement under the terms of which Socony got a participating interest in the concession, which it is presently exploring jointly with CPP.

Seismograph work has been carried on by the company through the German "Prakla" company. Geophysical surveys in the Tagus River basin northeast of Lisbon have been carried out, and several exploratory wells have been drilled. The principal area of interest is Torres Vedras, located a few miles north of Lisbon.

Pinhal Novo No. 1, an exploratory well about 12 miles east of Lisbon, went to 5,497 ft where it reportedly encountered the Miocene resting on the Triassic in a diapiric structure. Another well, Arruda No. 1, 18 miles north of Lisbon, has been drilled below 6,000 ft, and 5 shallow tests have been drilled in the Torres Vedras area. Some encouraging oil and gas shows have been reported.

Production and Refining

Aside from a small production of asphalt, there is no indigenous production in continental Portugal. The only refinery in the country is the Cabo Ruivo plant near Lisbon, which is owned by SACOR (SA Concessionaria de Refinacao de Petroleos em Portugal). This refinery has a crude throughput capacity of 25,000 b/d, with a 10,000 b/d TCC unit placed onstream in May 1954. One-third of SACOR is owned by the Portuguese government. The refining concession under which it operates carries a complete monoply over Portuguese refining through 1976.

In 1955 runs to stills at SACOR were 900,600 tons (about 18,012 b/d), of which 564,000 tons were for SACOR and 336,600 tons were refined for third parties. Runs in the first half of 1956 were 478,593 metric tons (about 19,722 b/d).

Marketing

Consumption of major products in continental Portugal during 1955 amounted to 25,110 b/d. Consumption in 1956 is estimated to have risen to 26,040 b/d, and by 1960 is expected to reach about 28,830 b/d.

All consumption is supplied by imports. Due to the rise in refinery runs as new capacity has been added to SACOR's plant, crude imports are rising rapidly and product imports declining. There are some exports to Portuguese colonies (which have a total area more than 22 times the size of continental Portugal). During 1955 these exports totaled 5,098 b/d.

TABLE I—PORTUGUESE PETROLEUM STATISTICS
(Thousands of Barrels)

Year	Production	Imports		Exports		Crude Runs to Stills	Consumption
		Crude	Products	Crude	Products		
1929	—	—	1,200	—	—	—	1,200
1934	—	—	1,274	—	—	—	1,274
1938	—	600	1,300	—	—	600	1,900
1944	—	—	1,600	—	—	—	1,600
1945	—	184	1,688	—	—	125	1,813
1946	—	534	1,838	—	—	705	2,543
1947	—	754	1,803	—	—	1,615	3,418
1948	—	2,231	3,357	—	—	2,129	5,486
1949	—	1,914	3,653	—	—	1,963	5,616
1950	—	1,963	2,211	—	—	2,124	4,335
1951	—	2,935	NA	—	183	2,678	6,905
1952	—	3,577	NA	—	NA	3,564	7,269
1953	—	1,082	6,590	—	NA	824	7,416
1954	—	5,279	3,099	—	1,861	5,354	8,775
1955	—	7,008	NA	—	NA	18,012	9,565e

NA—Not available. e—Estimated.

OIL LAWS

Exploration and development of petroleum in Portugal are governed by the general mining law, as promulgated by Decree-Law No. 18:713 of July 11, 1930. By Decree of April 7, 1937, applications for concessions were received for oil exploration, and a single concession was granted over most of the country to Pierce & Morley. It is this concession which is now owned by CPP. Although there are some special terms in the concession, the general regulation thereof is by the General Mining Law of 1930, as amended.

EXPLORATION: The initial stage is a preliminary permit for investigation, including geological and geophysical work but not exploratory drilling, except for shallow test holes. The duration of this stage is 18 months.

The permitee is obligated to spend approximately US $9,800 for the duration of the permit. There are no other fiscal obligations nor special taxes.

On termination, the permittee may continue under an exploration permit, which permits geological-geophysical exploration, including the drilling of exploratory wells. The concessionaire must organize a Portuguese company for this work within 20 months, with a minimum capital of US $140,000.

The area of the exploration concession is not limited. Duration is four years, dating from the beginning of exploratory drilling. The concession may be extended after this term. Drilling must consist of one or more wells, with a total depth of approximately 10,000 ft.

The concession may be surrendered without penalty, and with return of the guaranty fund, at any time.

The fiscal obligations of the exploration concession include an initial guarantee bond of US $7,400, plus US $980 for special expense guarantee. The guarantee deposited under the preliminary permit becomes the property of the government. The concessionaire must guarantee to spend a minimum of US $98,000 on exploratory drilling during the life of the concession. A surface tax is payable on the concession area which, on 0 to 500,000 hectares (0 to 1,235,000 acres), amounts to 15 centavos per hectare (US $0.0024 per acre); on 500,000 to 750,000 hectares, it amounts to 12 centavos per hectare (US $0.0021 per acre); and on any area in excess of 750,000 hectares (1,852,500 acres), it is 10 centavos per hectare (US $0.0015 per acre).

EXPLOITATION: A development concession is grantable, provided a commercial discovery of petroleum has been made. There is no definition of what constitutes a commercial discovery. Any related areas which are not included in exploration or development work are considered reserved in favor of the concessionaire.

The duration of the development concession is 50 years from the date of publication of the contract. This period includes preliminary and exploration periods. At the end of 50 years the government may, at its discretion, either take over the concession—with "proper" compensation—or grant a final 49-year extension.

The maximum area per concession is 500 hectares (1,234 acres). There is no limitation on the number of development concessions which may be held by one concessionaire.

Employment of foreigners is authorized for technicians necessary to proper performance of work; otherwise Portuguese labor must be used.

The concessionaire may surrender the concession at any time, without penalty, provided he has complied with the regulations. He may also transfer it in whole or in part with the consent of the Minister of Commerce and Industry.

Royalty is 12½% of production, minus field use. For calculation of the royalty when payable in cash, the value of equivalent USA crude oil during the previous year is used. Of the total of 12½%, 2% goes to the municipality and parish within which the well is located, and the other 10½% goes to the government.

The concessionaire is exempt from customs import duties on equipment used in operations.

NATIONAL FACTORS

Portugal has remained politically stable since 1926. In that year, Dr. Antonio de Oliveira Salazar assumed the dominance which he has retained ever since. The same stability is present in the economic situation. The economy has remained steady, although not very progressive; and the escudo has almost the status of a hard currency.

The labor situation is generally favorable to investment. The level of wages is low. A Portuguese government report gave the average daily wage at 20 to 30 escudos per day (US $0.66 to $1.05) during April 1955, but American companies in Portugal report wages at about US $1.47 per day for unskilled and US $2.33 for skilled workers. The total of labor security legislation is not great—amounting, in monetary terms, to about 23% of the base wage. Unions are not strong, being controlled by the government; and strikes are illegal. The high population density (250 per square mile) supplies an adequate labor force, although there is a shortage of skilled petroleum workers.

The escudo has an official parity of 28.75215 per dollar, with an official buying rate of 28.60 and selling rate of 28.95 (including a 5-centavo tax). There are no restrictions on the import of capital. The export of capital and profits is subject to government approval, with no guaranty from the Portuguese government available.

Taxation levels are generally lower than in the United States. The form most commonly used by foreign corporations is the Sociedad por Quotas (or quota company), which is a form of limited partnership. The total tax on this form of company amounts to 32.69% of assumed gross profits, less 6% of 50,000 escudos (US $105). On the Sociedad Anonima, the tax rate is similar.

END

NIGHT VIEW of Cities Service Refinery, Lake Charles, La.

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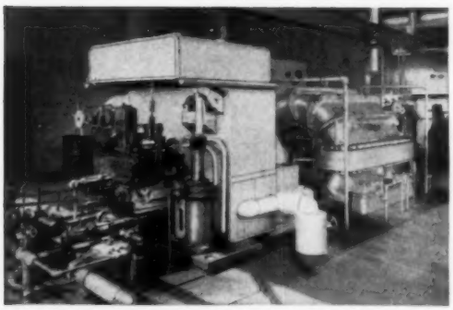

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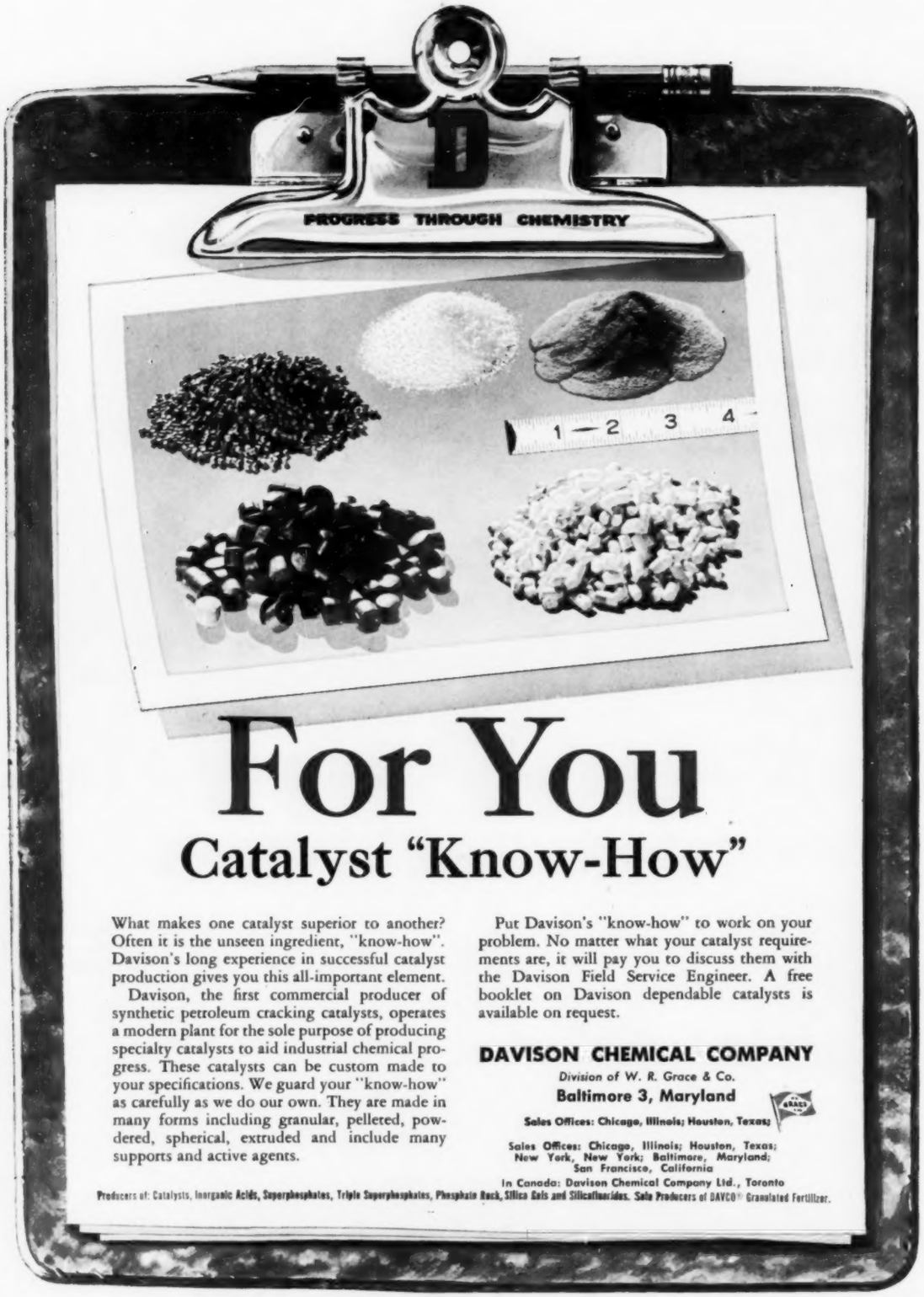

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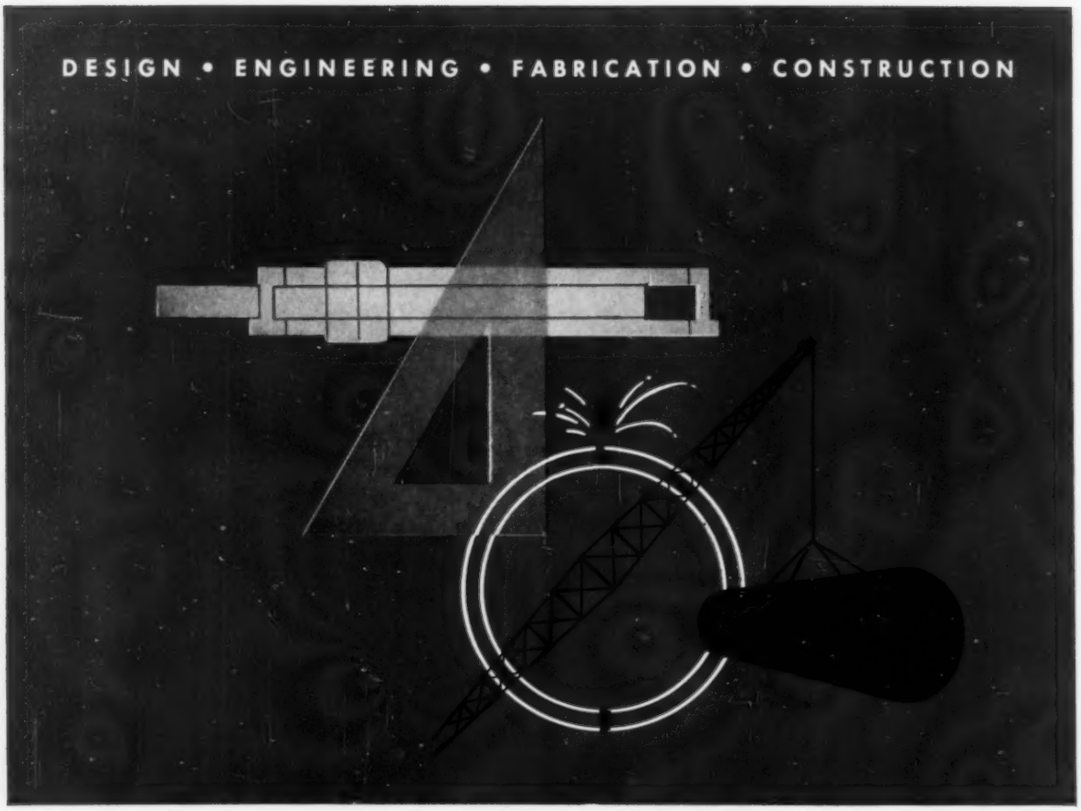

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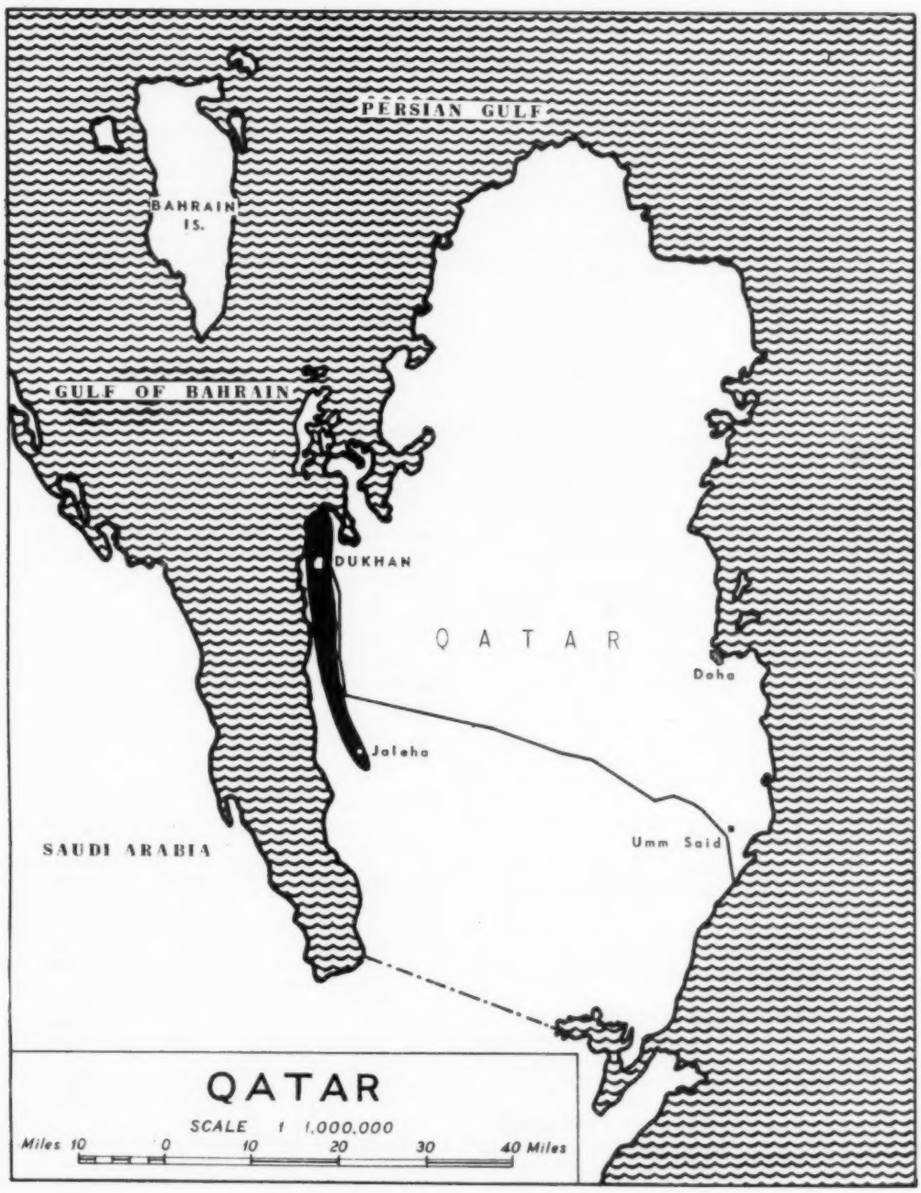
QATAR



Exploration, Production

Exploration in this small peninsula began before World War II, when an affiliate of Iraq Petroleum Co. (IPC) drilled three wells—all of them plugged at the beginning of the war.

Commercial production began in 1949, when 621,632 bbl were produced. It has shown an increase each year since, with the increases gradually becoming smaller. In 1953 output increased by about 23% over 1952. It increased 18% in 1954 over the previous year. Production in 1955 was about 13.8% over 1954, and in 1956 it averaged 127,500 b/d, or about 11.3% over 1955.

During 1955, nine wells were drilled by Qatar Petroleum Co., IPC's affiliate, for a total footage of 54,720. There is a total of 40 producing wells in Dukhan, the only productive field (as of March 1956). Two rigs are active in the field.

Exploration has been mainly offshore, where Shell Co. of Qatar Ltd. has obtained a concession covering the territorial waters of Qatar. Expenditure by the company had reached about $19.6 million early in 1956. The first wildcat well was Matbakh No. 1, drilled 35 miles north of Doha, the capital of Qatar, and 5 miles off the east coast of Qatar. Water depth was about 32 ft. The well was abandoned in August 1955, as a dry hole, at 6,706 ft. A second well, Idd El Shargi, was abandoned at 12,000 ft, 45 miles offshore from Doha, between Qatar and the Trucial Coast. The platform from which work was done was wrecked in a storm during December, 1956, and the operation may now be abandoned.

In the Dukhan field there are 40 producing wells (as of March 1956)—9 wells producing in No. 3 limestone and 31 producing in No. 4 limestone. One well, No. 35, is producing in the Uwainat zone. A well to about 15,500 ft is contemplated.

There are three degassing stations: Khatiyah, Jaleha, and Fahahil. With alterations currently in progress, these will have a total capacity of 185,000 b/d.

Proved reserves in the field are estimated at 1.5 billion barrels.

Refining

There is one refinery, a Foster Wheeler 600 b/d topping plant, which supplies local needs of Qatar for gasoline, kerosine, and diesel or gas oil.

Crude from the Dukhan field is transported via twin 14½-in. and 20-in. pipelines across the peninsula to Umm Said, about 60 miles away.

There are 3 loading lines at Umm Said, with the latest 24-in. line installed during March 1956. The terminal can now deliver about 170,000 b/d.

Oil revenues to the 25,000 population of Qatar are the highest in the Middle East, on a per-capita basis. Although revenues accrue solely to the Sheikh of Qatar, they have been invested in local improvements and in a capital fund of securities external to Qatar to supply income in future years after oil production diminishes.

Production in the country during the recent Suez crisis was little affected. END

TABLE I

QATAR CRUDE-OIL PRODUCTION—1956

(Thousands of Barrels Per Day)

January	120.3	July	123.9
February	126.8	August	126.8
March	131.1	September	121.5
April	127.5	October	129.8
May	127.0*	November	131.0*
June	124.4	December	135.0*
		Year	127.5*

*Estimate.

USSR

Production and Exploration

Production in 1956 was 630% higher than in 1928, and 618% higher compared with 1901, the peak year of pre-Soviet Russia.

Cumulative production from 1861 (i.e., since production statistics became available) until 1956 amounts to 9,118,605,000 bbl, of which 4,673,807,000 bbl were produced after 1941.

The goal of the current (sixth) Five-year Plan is to increase production from 1.4 million barrels per day to 2.7 million barrels per day. Fulfillment of this goal would bring Russia close to a level of one billion barrels of crude per year.

Reserves

Approximately 47% of Russia's land area of 8,648,640 square miles is a sedimentary basin favorable for oil accumulation. This would give a sedimentary-basin area of 4 million square miles, of which nearly one-tenth is continental-shelf area. The Caspian Sea and, in the north, the Barents and Kara Seas offer the best prospects for offshore drilling.

Russia's ultimate oil reserves may represent about one-third of the world's geological reserves. Its producible reserves amount to approximately 23 billion barrels. This represents some 15% of the world's proved reserves.

1) *The Ural-Volga region* extends from Stalingrad to Molotov (Perm). Its main producing areas are located in the territory of the Tatar and Bashkir republics; and the Kuibyshev, Chkalov, Stalingrad, Saratov, and Molotov provinces—listed in order of their production levels.

2) *Trans-Caucasian region*, where the Baku's producing fields are located, plus a cluster of newer fields farther south and west, covers mainly the territory of the Azerbaijan republic. Russia's only offshore production comes from the shallow shelf surrounding the Apsheron peninsula between the Artem and the Wulf Islands.

3) *North-Caucasus region* extends from Dagestan on the Caspian shores over the Old Grozny and the New Grozny, Armavir, Maikop, Krasnodar, and ends on the shores of the Azov Sea.

4) *Ukraina* has two producing areas: the Sumy-Romny, and the Transcarpathia, which was annexed from Poland in 1944.

5) In *North European Russia* there is Ukhta, located in the Komi republic, which is considered an extension of the Ural-Volga basin.

6) The *Emba salt domes* are divided into three regions: the South Emba, the North Emba, and the Aktyubinsk salt anticlines. Although the potential of the Emba region is appreciable, only the Gurev structure, on the Caspian shore, so far has been developed industrially.

7) In the *Central Asian Republics* there are:

a) The developments on Cheleken Island, and those at Nebit Dag in Turkmenia which, geologically, belong to the Trans-Caucasian structure;

b) Fergana Valley and Termez in the Uzbek republic; both are of local importance.

8) On the vast *Siberian sub-continent* only a few structures—all located on its fringes—have been developed:

a) The West-Siberian (Ob-Irtysh) basin is presumed to be potentially rich in oil, but only a large gas field has been struck so far (in 1953), on the lower reaches of the Ob River. This field may prove to be Russia's richest gas reserve;

b) In the Lena-Taymir basin three fields, Jlia, Kozhevnikov, and Nordvik, yield small quantities of oil used mainly to cover the needs of the northern sea route. Farther south are several small developments along the Tuolba and Vilyui valleys.

9) In the *Far East* are the oil developments on Sakhalin Island and those on the Kamchatka peninsula—both of local importance.

Official Soviet sources announce "plan" fulfillments or developments according to six geographical and administrative regions which do not always coincide with the main basins or the producing areas. These are:

1) Volga area, which covers the Kama-Volga basin.

2) Middle area, which includes Emba, Stalingrad, and the East Ukrainian developments.

3) The western Oblast of Ukraina, which is another name for the Transcarpathian fields.

4) Southern area, which probably covers the northern Caucasus, Trans-Caucasus, Turkmenia, and the Uzbek producing fields.

5) The Far North, which extends from Ukhta over Vorkuta, Igarka, to Jlia and Vilyui fields.

6) The Far East, in which are lumped together Sakhalin and Kamchatka.

On other occasions, Soviet pronouncements divide the "plan" results between two main geographical areas:

1) The European districts, which include all producing fields west of the Volga River.

2) The Eastern districts, in which are included all the other fields.

The growth of crude-oil production by main regions during the past 15 years, as well as the production targets set for 1960, are shown in the tabulation hereinafter under the topic "Drilling."

During the past 15 years a remarkable shift has occurred in the geographical distribution of oil production. Whereas, in 1940, 71% of Russia's crude production came from the Azerbaijan republic (Baku), in 1955 this region contributed only 22% of the total yield. With an almost stationary production, Baku's share of the total production expected in 1960 will represent only 12%. This decline is of a structural nature and, thus, not open to remedy.

The bulk of Soviet production now comes from the Ural-Volga basin (the so-called "Second Baku") which, between 1950 and 1955, had more than trebled its output. It is slated to increase again by 2½ times between 1951 and 1960; in the latter year its share will represent 70% of the total Soviet production. There are three reasons which explain this upsurge:

1) Industrial development in this area has reached the point where a substantial increase in production does not require investments proportionate to the production for building roads, railways, water supply, pipelines, housing for workers, repair shops, and other installations.

2) Very large reserves, still undeveloped, were discovered in this area during the last Five-Year Plan.

3) Gas repressuring and water-flooding recovery methods had been well planned by 1948, widely applied afterwards, and now are bringing results.

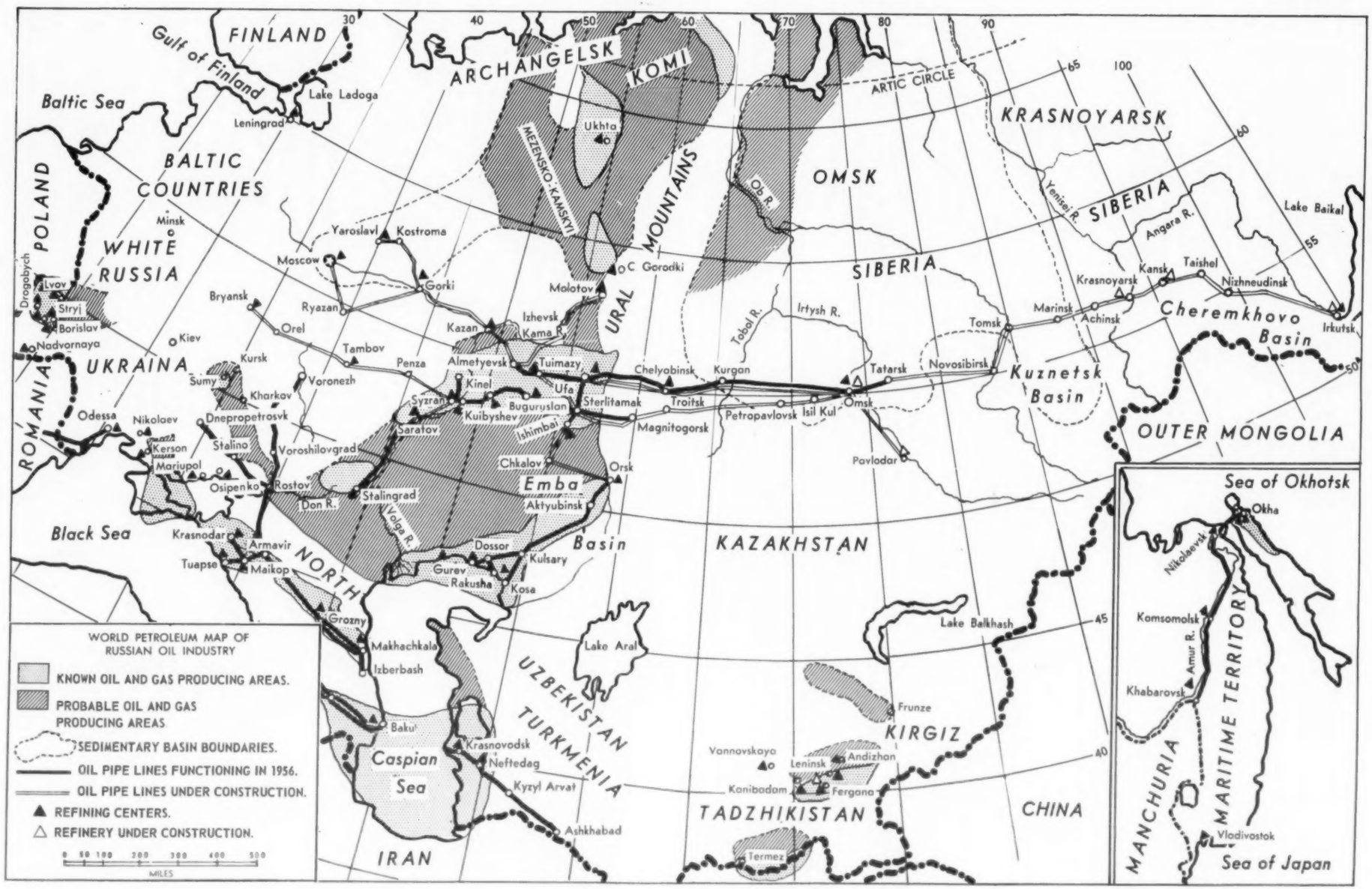
With the exception of the Sakhalin and the Transcarpathian fields—where great efforts are being made to raise production—in most of the remaining fields production levels are commensurate to local processing capacity and consumption needs.

Drilling

Drilling activity in Russia's planned economy has evolved as follows (figures in thousands of feet):

Five-Year Plan	*Year*	*Footage*
First	1928	1,187
	1932	2,440
Second	1933	2,740
	1937	6,478
Third	1938	5,792
	1941	5,904
Fourth	1945	1,738
	1950	5,982
Fifth	1953	17,712
	1954	16,072
	1955	16,400
Sixth	1956	18,040
	Plan 1960	18,000

The share of drilling performed with turbodrills increased during the past five years.


WORLD PETROLEUM MAP OF
RUSSIAN OIL INDUSTRY
KNOWN OIL AND GAS PRODUCING AREAS.
PROBABLE OIL AND GAS
PRODUCING AREAS.
SEDIMENTARY BASIN BOUNDARIES.
OIL PIPE LINES FUNCTIONING IN 1956.
OIL PIPE LINES UNDER CONSTRUCTION.
REFINING CENTERS.
REFINERY UNDER CONSTRUCTION.
0 50 100 200 300 400 500
MILES
Gulf of Finland
FINLAND
Baltic Sea
Lake Ladoga
Leningrad
BALTIC COUNTRIES
POLAND
WHITE RUSSIA
Minsk
Drogobych
Lvov
Stryj
Borislav
Nadvornaya
Kiev
UKRAINA
ROMANIA
Odessa
Nikolaev
Kerson
Mariupol
Black Sea
Dnepropetrosvk
Stalino
Voroshilovgrad
Osipenko
Rostov
Don R.
Krasnodar
Armavir
Tuapse
Maikop
NORTH
Grozny
Makhachkala
Izberbash
Baku
Caspian Sea
IRAN
Moscow
Yaroslavl
Kostroma
Gorki
Bryansk
Ryazan
Orel
Tambov
Kursk
Sumy
Kharkov
Voronezh
Penza
Saratov
Stalingrad
Volga R.
Syzran
Kuibyshev
Almetyevsk
Kinel
Ufa
Buguruslan
Ishimbai
Chkalov
Emba
Aktyubinsk
Orsk
Dossor
Kulsary
Gurev
Rakusha
Kosa
Lake Aral
UZBEKISTAN
TURKMENIA
Krasnovodsk
Neftedag
Kyzyl Arvat
Ashkhabad
ARCHANGELSK
KOMI
MEZENSKO-KAMSKYI
ARTIC CIRCLE
Ukhta
Molotov
Izhevsk
Kama R.
Kazan
C Gorodki
URAL MOUNTAINS
Ob R.
OMSK
KRASNOYARSK
SIBERIA
Yenisei R.
Angara R.
Lake Baikal
Tobol R.
Irtysh R.
Chelyabinsk
Kurgan
Tatarsk
Novosibirsk
Tomsk
Marinsk
Achinsk
Krasnoyarsk
Kansk
Taishet
Nizhneudinsk
Irkutsk
Cheremkhovo Basin
Kuznetsk Basin
Troitsk
Magnitogorsk
Sterlitamak
Petropavlovsk
Isil Kul
Omsk
Pavlodar
OUTER MONGOLIA
KAZAKHSTAN
Lake Balkhash
Frunze
KIRGIZ
Vannovskaya
Leninsk
Andizhan
Konibadam
Fergana
TADZHIKISTAN
CHINA
Termez
Sea of Okhotsk
Okha
Nikolaevsk
Komsomolsk
Amur R.
Khabarovsk
MANCHURIA
MARITIME TERRITORY
Vladivostok
Sea of Japan

Refining

The planned levels for refining capacities are (figures in thousands of barrels):

Year	*Topping*	*Cracking*
1950	284,700	85,559
1955	474,500	214,349
1960	803,000	396,000

Even when the construction goals set for 1960 have been fulfilled, topping capacity will be less than 2.2 million barrels per day because several small-size and old primary distillation units will have been shut down as uneconomic.

Only a few of the existing installations form an integrated unit capable of processing a complete line of products. This results in a low percentage of light products, diesel oil of high sulfur content, and lubricating oils of poor quality. Diesel oil, on the average, has a sulfur index of 1.2, a congelation point of 32 F, and a high paraffin content. In 1955, the gasoline had an octane rating of 56. In 1955 several major plants started producing gasoline of 66 octane rating.

New and large refineries are under construction which will raise the average quality of products. The program provides for expanding the Omsk plant; building of one unit each in Ukraina and Belorussia; starting operation at the new Fergana refinery; construction of two plants in Kazakhstan, one in the Krasnoyarsk area and, later on, of a new refinery near Amur.

Transportation

As a land power, Russia must rely mainly on its land transportation system. Shipment of total freight is carried, according to weight and distance, in these proportions:

	%
Railroad	84.5
Water transportation	11.4
By motor cars, pipelines, aircraft, and animal traction	4.1

The greatest proportion of crude and oil products is carried by water. This proportion increased visibly after the opening in 1952 of the Volga-Don Canal, which joined into one transportation system some 27,000 miles of river shipping lanes in the European part of Russia.

Second in importance are the railroads. Following are the index figures of oil load carried by rail:

	Index
1940	100
1950	143
1955	280

According to official indications, the volume of crude and oil products carried by pipelines increased in this manner:

	Index
1940	100
1950	129
1955	364
Plan 1960	800

At the end of 1955, some 12% of the oil load was carried by pipelines. By 1960, this proportion is planned to go up to 25%, or 26% of total oil shipments.

By the end of 1952, the pipeline network was 6,300 miles long, in which figure were included also the field gathering lines. Their diameter varied between 6 in. and 14 in. In 1953, a plan for expanding the pipeline network was launched, the first achievement of which was the 800-mile line connecting Ufa to Omsk, commissioned late in 1955. During the sixth Five-Year Plan the network will be lengthened by an additional 9,000 miles. Hence, by 1960, the total length of the Soviet pipeline network may reach 16,300 miles. The carrying capacity of the network will go up from 8.5 million barrel-miles per day, in 1955, to 51 million barrel-miles per day in 1960. This manifold increase denotes that the pipelines under construction will be of a larger diameter, and that the operating pressure will be appreciably higher. It is planned further to switch, during the current plan, half of the network to automatic control.

On January 1, 1956, the Soviet tanker fleet represented 0.63% of the world's tanker tonnage. Out of this total, 168,000 dwt were ocean-going craft. During the 1956-1960 period, Russia plans to increase its tanker tonnage to 730,000 dwt.

Exports, Imports

According to statistics published by countries outside the Soviet orbit, exports of crude and oil products listed as originating from Russia show this picture (in millions of barrels):

1928	20.3
1932	44.6
1939	6.8
1950	1.1
1952	7.4
1953	14.6
1954	17.9
1955	24.0
1956	29.9 (provisional figure)

During the last 2 years listed, some 65% of the quantities mentioned found outlets on West European markets, while the balance was directed to the Middle East and Argentina.

Approximately one-half of the 1955 exports consisted of fuel oil, followed in order by gas oil, diesel oil, motor gasoline, crude oil, and kerosine.

During the 1950-55 period, Russia controlled

TABLE I

PERCENTAGE OF DRILLING DONE BY TURBODRILLS

	1950	1953	1954	1955
Eastern districts	46.7	81.4	89.8	97.1
European part of Russia	15.8	51.3	61.6	70.7
Azerbaijan	20.7	35.5	44.0	51.2

TABLE III

STATUS OF SOVIET TANKER FLEET (AS OF JANUARY 1, 1956)

	Units	DWT	Total
Vessels of 6,000 dwt and more			
Steam	5	56,530	
Motor	15	145,489	202,019
Vessels under 6,000 dwt			
Steam	5	10,347	
Motor	34	58,221	68,568
Total	59		270,587

TABLE II

CONTRIBUTION OF FOSSIL FUELS TO RUSSIA'S ENERGY CONSUMPTION

(Figures in Percentages of Total)

Year	Hard coal and lignite	Peat	Shale	Total solid fuels	Petroleum	Natural gas
1913	65.3	1.9	—	67.2	32.8	—
1928	62.3	2.5	—	64.8	34.4	0.8
1932	59.7	6.7	0.1	66.5	32.2	1.3
1937	67.1	6.2	0.1	73.4	25.0	1.6
1940	70.1	6.0	0.3	76.4	21.7	1.9
1950	73.2	5.0	0.7	78.9	18.9	2.2
1955	70.4	4.2	0.7	75.3	22.2	2.5
1960 Plan	63.4	3.8	0.4	67.6	25.3	7.1

TABLE IV

CRUDE-OIL PRODUCTION IN THE USSR

Five-Year Plan	Year	Crude Production (Thousands of Barrels)	Increase + or Decrease — %
	1928	83,559	
	1929	100,721	
First	1930	127,482	
	1931	155,767	
	1932	162,758	+95
	1933	163,485	
	1934	178,017	
Second	1935	185,283	
	1936	189,643	
	1937	200,500	+23
	1938	215,800	
Third	1939	221,141	
	1940	226,016	+ 5
	1941	242,423	
	1942	231,732	
War Period	1943	206,093	
	1944	171,354	
	1945	141,789	—42
	1946	157,900	
	1947	186,700	
Fourth	1948	211,440	
	1949	261,013	
	1950	275,381	+74
	1951	307,352	
	1952	343,482	
Fifth	1953	383,645	
	1954	430,874	
	1955	514,382	+67
Sixth	1956	610,344	
Plan	1960	980,910	+61

TABLE V

MAIN PRODUCING REGIONS OF SOVIET RUSSIA

(Thousands of Barrels)

	1940	1950	1954	1955	PLAN 1960
RSFSR:					
Ural-Volga Basin	13,800	75,688	181,139	253,805	686,630
North Caucasus, Far North, Far East	37,305	56,866	96,619	104,133	115,070
Total	51,105	132,554	277,758	357,938	801,700
UKRAINA:					
Transcarpathia, Sumy-Romny fields	2,545	2,150	3,015	3,858	10,802
GEORGIA	298	322	371	312	360
AZERBAIJAN:					
Apsheron peninsula, Offshore developments	161,512	107,727	110,741	111,206	113,150
CENTRAL ASIAN REPUBLICS:					
Turkmen	4,245	14,685	20,795	22,714	23,134
Kazakh	5,064	7,695	10,056	10,151	14,211
Uzbek, Kirghiz, Tadzik	1,247	10,248	8,138	8,203	17,553
Total	10,556	32,628	38,989	41,068	54,898
TOTAL SOVIET RUSSIA	226,016	275,381	430,874	514,382	980,910

the entire Austrian oil production of between 20 million and 25 million barrels per year; while from Romania it drew from 15 million to 27 million barrels of crude and products annually on the reparation account—hence free of charge. If these quantities are compared with Soviet oil exports, the result was that Russia actually exported less than half of what it received from those two countries on noncommercial accounts.

Consumption

Fuels and energy production has evolved in this manner:

	1950	*1955*	*Plan 1960*
Coal: millions of metric tons	261.1	390.1	593.0
Petroleum: millions of barrels	275.4	514.4	980.9
Gas: billions of cubic feet	218.6	363.7	1,283.3
Electric power: billions of kilowatt-hours	91.2	166.8	320.0

As there are no exports of fuels and energy, their production levels indicate Russia's actual consumption as well.

If all fuels and energy produced were transformed into Btu's according to their comparative caloric values, Russia's supply picture would then be this (in percentages of the total supply):

	1955	*Plan 1960*
Solid fuels	62.5	54.9
Liquid fuels	17.6	20.1
Natural gas	2.2	5.2
Electric energy	17.7	19.8
	100.0	100.0

HUNGARY

Production

Compared with the peak year of the precommunist era, production has evolved as follows (thousands of barrels):

1943	6,210.3	1952	4,120.0
1948	3,458.3	1953	6,150.3
1949	3,745.8	1954	8,501.1
1950	3,927.3	1955	10,838.8
1951	3,482.7	Plan 1956	11,381.7

Political circumstances prevailing in Hungary during the last quarter of 1956 affected adversely oil production. From the goal set for that year, no more than 8 million barrels actually were produced.

Production comes primarily from the fields discovered in 1937 in Zala County: Budafapuszta, Lovaszi, and Gellenhaza. The rise in production after 1953 is explained by the discovery in 1951 of the Nagylengyel deposit, located a few miles north of Budafapuszta. Although its proved reserves are great, production of the Nagylengyel deposit is hampered by technical difficulties in surfacing and processing of this crude of high viscosity (API gravity, 6.53), which has a high-sulfur and high-asphalt content. In usual distillation processing, the Nagylengyel crude yields only nominal quantities of gasoline. The sole economic processing method is medium-pressure hydrogenation, by which also sulfur is freed. Very little of this crude is being processed in the small cracking unit at Pet. A larger refinery is under construction at Szoeny, on the Danube, to handle the Nagylengyel crude, and to produce small quantities of petrochemicals as well.

ROMANIA

Production

According to official estimates, crude-oil production was as follows (in thousands of barrels):

1936	62,280.0	1948	31,125.0	1953	70,280.1
1939	46,800.0	1949	32,400.0	1954	72,547.0
1942	42,347.0	1950	41,563.5	1955	79,348.0
1945	34,800.0	1951	51,387.6	1956	84,175.0
1947	28,575.0	1952	54,450.0		
			Plan	1960	101,919.5

The post-1950 increase is due to: (1) development of State lands on which no concession acreage was granted prior to the communist régime; (2) drilling of deeper producing horizons; (3) discovery of new fields in the Dambovita, Arges, Valcea, and Gorj counties; (4) extension of the old fields, particularly of those in the shallow formations of the Moldavian region; (5) geological activity carried on a wider scale; and (6) application of secondary-recovery methods.

Current production originates from:

	%
Oil fields in Muntenia	63
New fields in the Dambovita, Arges, Valcea, and Gorj counties	26
Moldavian fields	11

Approximately 7% to 8% of the current production is accounted for by application of secondary-recovery schemes, including gas repressuring.

Drilling activity has been going on in all parts of the old oil regions in Muntenia—specifically between the Buzau and Dambovita Rivers—in search of new formations and horizons. It is in this area that the State lands lie, and also where the deeper horizons have been tapped.

The new fields developed after 1948 lie west of the Dambovita River, and are located at Pitesti, Suta Seaca, Costesti, Valea Caselor, Plopeni, as well as on the anticlines along the northern border of the Getic depression, from Valcea to Gorj.

Proved reserves may be assessed optimistically at 800 million barrels. At the current rate of production, this represents a 10-year supply.

Prospects for new discoveries are dim. This is corroborated by the modest production target of 101 million barrels set for 1960, which represents a planned annual increase in crude production of only 5½%. As officially stated, this goal may be met only if (1) at least 55% of all drilling is done for exploration purposes; (2) drilling speed rises by 25% between 1956 and 1960; (3) secondary recovery is applied on a larger scale; and (4) no less than 85% to 90% of gas is used for repressuring purposes.

Drilling

Drilling activity rose in 1955 to the highest level ever recorded, i.e., 6 million feet, of which, from 1953 on, half was exploration.

The high production rate during the past five years has exhausted much of proved reserves and thereby diminished the reserve-production ratio. To keep production at its present level, the proved reserves must be replenished at a faster pace. This means a higher proportion of exploration drilling.

The deepest well was drilled in 1955, at 13,700 ft, in the Boldesti area.

Refining

With the going on steam of the two new plants at Borzesti and Darmanesti, in Bacau County, after the expanding of the Teleajen plant, and the addition of new installations at several old plants, topping capacity rose to 56.2 million barrels per year, and cracking capacity to 25.2 million barrels per year. These figures represent theoretical capacities which, in fact, are never fully utilized. The current plan provides for the construction of a new refinery, regarding which no details are available.

Domestic Consumption

Oil consumption for nonmilitary purposes is currently at an annual rate of 14 million barrels of products, which represents 20% of the total processed production. Private consumption is being discouraged by high prices and rationing. There is almost no private motoring in Romania. Industrial consumption has also been curtailed by rationing and substituting cheaper solid fuels. Natural-gas consumption is being introduced on a larger scale in towns and industries. Production of LP Gas is increasing, and a pipeline was commissioned in 1955 for carrying this product from Ploesti to Bucharest.

Romania has very large natural-gas reserves in the Transylvanian plateau. Current production is of about 140 billion cubic feet, but a target of 283 billion cubic feet has been set for 1960, by which time also the gas pipeline from Transylvania to Moldova should be commissioned.

EXPORTS: From the balance of Romanian oil production, Russia gets some 50 million barrels —or nearly 62% of the total output—mainly as annual installment for the sale of the Soviet share in the disbanded joint oil company, Sovrompetrol. Part of this quantity is used to supply Ukraina, for which purpose a direct pipeline was laid in 1945 from Ploesti to Odessa. The remainder is being exported to markets within and outside the Soviet orbit on Soviet commercial account.

SOVIET ORBIT

Excluding Romania, Hungary, and China—which are treated separately—the Soviet orbit countries of Albania, Bulgaria, and East Germany are self-sufficient in liquid fuels (the latter from its synthetic-fuel output); whereas Poland and Czechsolovakia must import substantial quantities of crude and oil products (mainly from Romania) to cover their rising consumption.

East Germany's crude-oil production is negligible, but its synthetic-fuel output reached a level of 14,580,000 bbl in 1955. Czechoslovakia's main source of supply is still oil-from-coal, of which output may have gone up in 1955 to 2,600,000 bbl. Poland is concentrating increasingly on coal chemistry, as well as on natural gas. Its synthetic-fuel output in 1955 was approximately 1,300,000 bbl. END

CRUDE PRODUCTION IN THE SOVIET ORBIT (THOUSANDS OF BARRELS)
(Excluding Romania, Hungary, and China)

Year	Poland	Albania	Czechoslovakia	Bulgaria
1948	1,038.7	585.1	331.7	—
1949	1,149.9	686.0	366.2	—
1950	1,320.6	877.8	427.3	—
1951	1,355.8	812.0	501.9	—
1952	1,835.8	992.2	752.8	—
1953	1,446.7	1,322.5	832.5	—
1954	2,108.3	1,618.8	1,095.0	211.8
1955	1,912.0	1,751.6	1,221.0	1,219.0
1956 Estimate	2,513.6	1,900.0	1,310.0	2,683.0

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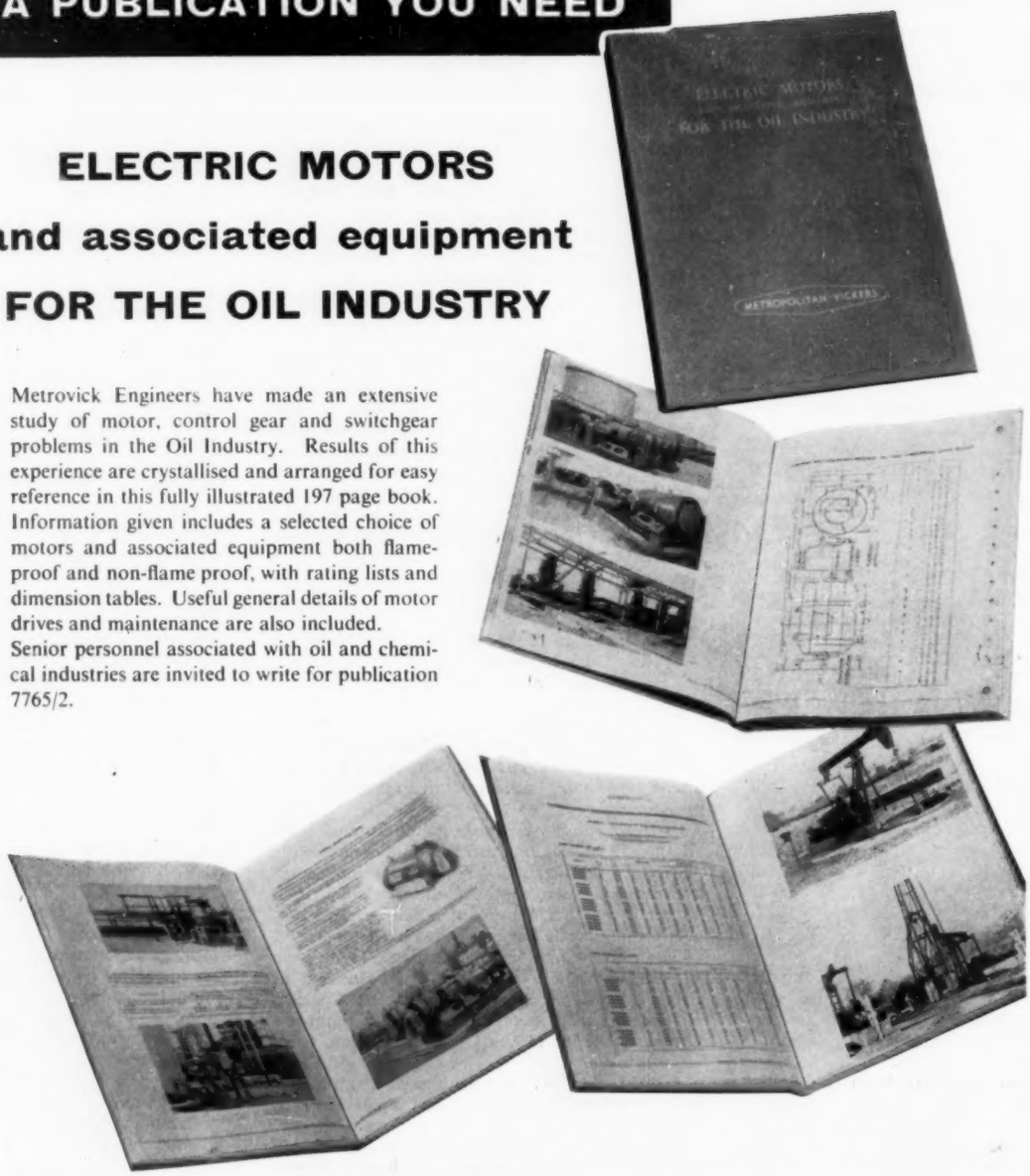

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SAUDI ARABIA

Exploration

The only oil concession in Saudi Arabia (outside of the Saudi part of the Neutral Zone) is the Aramco (Arabian American Oil Co.) concession. A previous concession was held over western Saudi Arabia, granted in 1936 to Iraq Petroleum Co. and relinquished in 1941.

Exploration began in September 1933 in the Damman area opposite Bahrain. Oil was found, in 1938, at 4,700 ft. There followed a series of discoveries including the Qatif field, which is relatively small, the Abqaiq field and, finally, the largest discovery of all, the Ghawar field. The latter was located in the Aid Dar area in 1948. In 1951 and 1952, four other fields—Haradh, Huiya, Uthmaniyah, and Shedgum—were found within a 65-mile radius, and further drilling revealed they are probably one continuous field.

There are three other proved areas which have not yet come into production. These are Fadhili, Abu Hadriya, and Safaniya. The latter was discovered in 1951 in the northern part of the country, and is partly an offshore area.

In the Rub' al-Khali or Empty Quarter, in the southwest, a dry stratigraphic well was drilled about 200 miles southeast of Uthmaniya during 1954. Depth of the well was 11,864 ft, a record at that time for Saudi Arabia. During 1955 it was drilled to 14,875 ft.

Seven more wells were drilled during 1955, all of them in the Ghawar field. They tested prospects for deep production in the Shedgum and Uthmaniyah areas, without success. The Hadriya zone, below the Arab zone, was placed on production in Agqaiq field by deepening of two wells.

Four drilling rigs were active during the first half of 1956. Another rig was brought in later, and another is scheduled tentatively for 1957. One well has been completed in Ghawar, and two in Safaniya—of which one went to 13,297 ft, more than 7,000 ft below the field's producing Cretaceous zone.

During June 1956, Arabian American Oil Co. (Aramco) announced a discovery at Kharsaniyah, No. 1, an exploratory well located 80 miles northwest of Dhahran. The well was completed as a producer in the D member sand of the Arab zone, although potential production was developed in the A, B, and C members as well. Some oil in lésser amounts was found in the Middle Jubaila zone, none was found in the Hadriyah or Fadhili zones. A second well is new drilling about four miles north, designated Kharsaniyah No. 2.

In addition to these wells, Aramco has continued work with three structural drilling parties—three seismic, one gravity-magnetic, and one surface-mapping party. Work in the Rub al Khali established the presence of a separate Tertiary basin, which may indicate the Jurassic trend, but does not extend far south of Ghawar field.

The government began an aerial photographic survey in 1956 of 200,000 square miles in the eastern part. Aramco did a similar survey over the southern Rub al Khali in 1955. A seismic party operated in the gravel plains during the first half of 1956, and another operated for a month offshore in the Persian Gulf.

Production

Arabian production began on a commercial scale in 1936, totaling 20,000 bbl in that year. It rose to 3,934,000 bbl in 1938, and remained only slightly above that level until 1945. In that year, rapid development began, and increased every year through 1955, when Aramco reported a record 965,041 b/d average for the year, compared with 953,000 b/d in 1954. Production in 1956 continued to increase, until affected by the Suez crisis in November.

A total of 154 wells was producing in Arabia at the beginning of 1956. The most important field is Ghawar—including Shedgum, Uthmaniyah, Huiya, and Haradh. Producing depths are 7,125 ft to 5,800 ft, all in the Arab zone or upper Jurassic oölitic formation. Gravity of the oil produced is of 35 API in the first three, and 34 API in the latter two, with about 1.3% sulfur.

The second field of importance is the original major discovery of 1941, Abqaiq. Producing depth is 6,800 ft from the same formation as Ghawar, but with 38 API gravity oil.

Next in importance is the Damman dome, the original discovery of 1938. Producing depth is 4,850 ft, gravity 35 API, from the Arab zone.

Finally, there is the Qatif field of 1945, with a producing depth of 7,350 ft and 35 API production—followed by the Abu Hadriya field of 1940, which is the deepest, at 10,115 ft and with 36 API production; and the Fadhili field of 1949, with 38 API production from 9,850 ft.

The last field is Safaniya, producing 27 API oil from 5,560 ft—the only field not in the Arab zone. It produces instead from the Cretaceous. Proved area is 125,000 acres. Commercial production from Safaniya was estimated to begin in 1957, at about 125,000 b/d—to rise to 195,000 b/d in mid-1958—all offshore from 15 wells.

Crude Production in Saudi Arabia—1956
(Thousands of Barrels Per Day)

January	1,000.2	July	1,033.6
February	1,013.7	August	1,005.8
March	1,009.0	September	1,047.9
April	1,054.1	October	1,054.9
May	1,121.3	November	719.8
June	1,083.3	December	720.0*
		Year	988.6

*Estimated.

Reserves in Saudi Arabia are estimated at 36 million barrels as of January 1, 1956, but this is probably low because the Ghawar field has not been fully proved as yet.

Transportation

Transportation in Saudi Arabia is principally by pipeline. There is a pipeline network, as indicated on the accompanying map, which centers mainly on Daharan and Qatif junctions. These lines range from 12 in. to 30 in. in diameter, and transport the crude from the junctions to the refinery and marine terminal at Ras Tanura. To the Bahrain refinery go two 12-in. lines, with a total estimated capactiy of about 195,000 b/d. The principal line is Tapline, a US $220 million 1,068-mile line from Qatif to Sidon, Lebanon, on the Mediterranean. Capacity is about 320,000 b/d, which can be raised to 500,000 b/d by additional pumping stations. In 1955 deliveries were 319,178 b/d. The location of the pipeline makes it possible to ship from any of the major producing fields, and the nearby marine terminals make it possible to utilize a maximum of tanker transportation when rates for tankers are favorable.

International Bechtel Inc., pipeline contractors, began construction during 1956 of a $12 million, 22-in. pipeline to connect Safaniya field with Ras Tanura refinery. The distance is 137 miles. Completion date was scheduled for April 1, 1957, and initial capacity will be 50,000 b/d to 75,000 b/d—later to be increased to 125,000 b/d.

Tapline announced that a 90,000 b/d capacity increase would be installed, with 4 new pumping stations increasing deliveries to 410,000 by January 1, 1958.

Refining

The only refinery in Saudi Arabia is located at Ras Tanura. Crude capacity is in the neighborhood of 200,000 bbl per stream-day, with 26,000 b/d thermal reforming capacity. Runs during 1955 averaged 203,210 b/d. A catalytic polymerization plant was installed in 1953, and a 12,500 b/d fluid hydroformer in 1955. Production in 1955 from the refinery was principally of fuel oils, which totaled 35,401,508 bbl; diesel oil, which totaled 15,177,304 bbl; gasolines, 11,092,263 bbl; kerosines, 5,377,752 bbl; asphalts, 209,766 bbl; and liquefied petroleum gases, 23,849 bbl. A 15,000 b/d desulfurization unit is under construction.

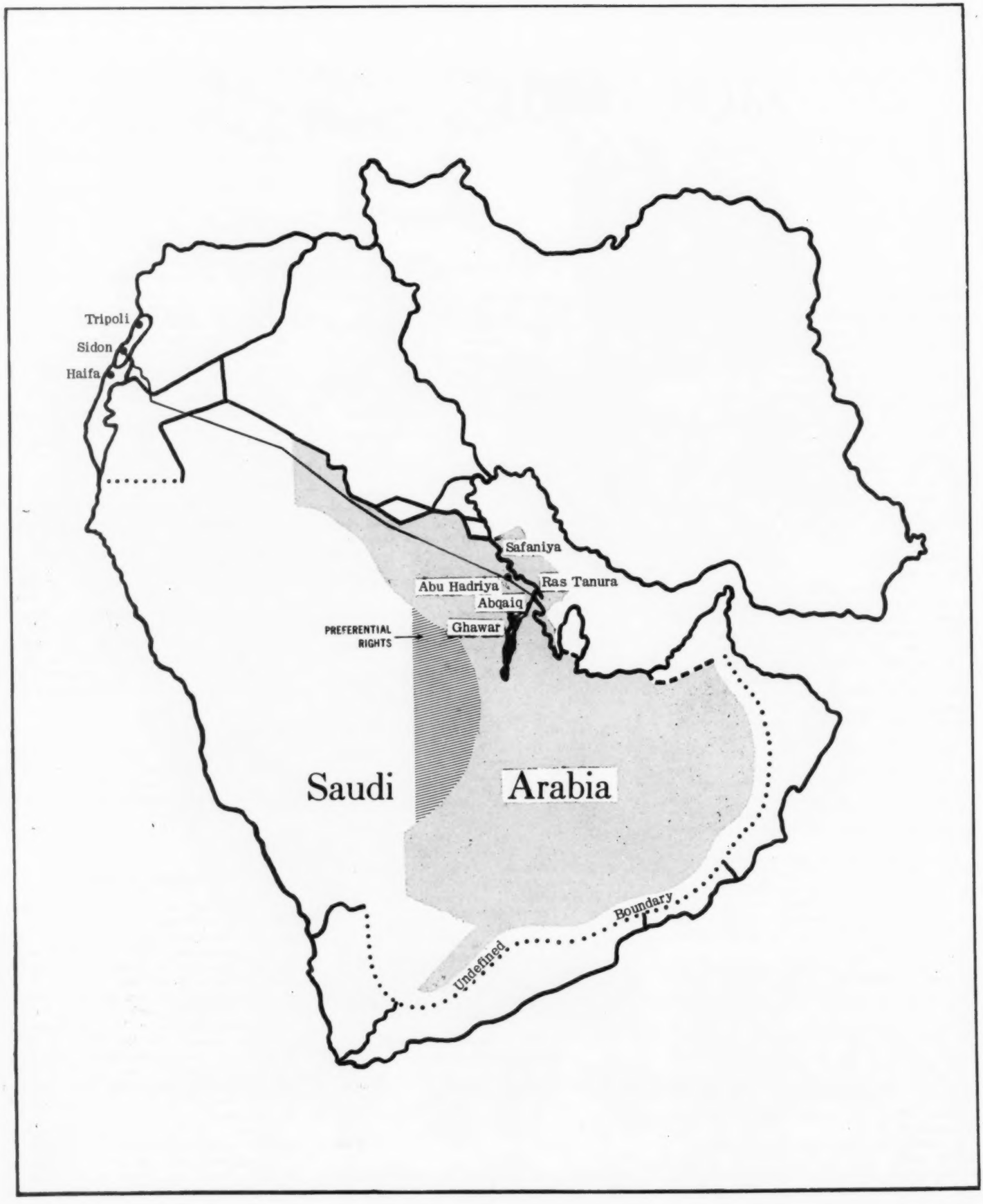
Marketing

Local consumption within Arabia (excluding Aramco) consumed only 5,655 b/d in 1955. Distribution is mainly handled by Aramco, to 81 local retail service stations, by truck and railroad. The west coast is served by tanker at the Red Sea port of Jiddah, the main consuming center.

CONCESSION TERMS

An exploration concession was given to Standard Oil Co. of California by Ibn Saud, in 1932, covering the eastern province of Hasa. Later, a half interest was obtained in this concession by The Texas Co. in exchange for marketing facilities. After World War II further division of ownership left the concessionary company, Aramco, owned 30% each by Standard Oil Co. of California, The Texas Co., and Standard Oil Co. (New Jersey), with 10% owned by Socony Mobil Oil Co. For this division the latter 2 companies advanced $76.5 million and $25.5 million, respectively, plus $37.5 million and $12.5 million for their interest in Trans-Arabian Pipe Line Co. (Tapline).

Provision was made to divide production and pipeline facilities proportionately to ownership—with allowance for each partner to buy more or less of crude or products as he chose. The price established was called the "offtakers price" and, until 1950, was set at US $1.43 per barrel—with proportionate sharing of Tapline costs add-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ing 10%. Aramco was set up as a profit-making corporation, rather than a service organization, as was Iraq Petroleum Co.

The original concession, as signed on May 29, 1933, gave exclusive rights to petroleum exploration, development, refining, and exportation of petroleum for 60 years over 318,000 square miles in eastern Saudi Arabia, known as the "exclusive area," stretching from the north to the south boundary and west to the Dahana sand strip. There was an additional 177,400 square miles of preferential area which Aramco could have by meeting the offer of any other group—later extended to include a total of 440,000 square miles.

In 1947 and 1948 the preferential area was reduced, and Aramco's exclusive right to the offshore areas of the Persian Gulf bordering Saudi Arabia was confirmed. Aramco gave up its rights to the Neutral Zone in 1948. Provisions were made for Aramco to relinquish part of the exclusive area in the original concession from time to time, 90 days after the beginning of drilling. In July 1955, Aramco made its third territorial relinquishment, surrendering 33,000 square miles in the northwest and southeast.

The original term of the concession was 60 years (to 1993) covering the 318,000 square miles of exclusive area then contained, plus 177,400 square miles of preferential area. In 1939, 120,000 miles of "additional area" were added which ran until 1999—and, by letter agreements of 1941, 1943, and 1946, all these terms were extended 6 years, making them 1999 and 2005, respectively.

Aramco was given the right to terminate the contract on 30 days' written notice, with all immovable property reverting to the government without compensation and 2 months' option to the government to purchase remaining property at replacement value, minus depreciation. The standard *force majeure* clause was contained, as well as provision for arbitration if agreement could not be reached.

Aramco accepted the obligation to build a refinery as soon as commercially feasible, although no levels of refining were specified. The government received the right to free petroleum in the 1933 agreement—raised, in 1950, to 2,650,000 gal of gasoline, 200,000 gal of kerosine, and 7,500 tons of road asphalt annually. Employees of Aramco were to be Saudi Arabs as far as practicable, but the management was left to Americans. Subsidiaries could be formed—subject to the terms of the concession—for their operations; and, if public shares were offered, Saudi Arabs were to be given the opportunity to subscribe to 20%.

By the original concession, Aramco pays 4 gold shillings per ton produced, or its equivalent in US dollars at the average exchange rate, less 10 cents—payable on a net basis, which is total production of crude less water and foreign substances, oil supplied to the government, and company use. Natural gas is subject to a royalty of 12.5% of sale receipts, with no obligation to produce or sell it.

An important part of the concession is the understanding relating to the exchange rate. All Aramco's payments were to be in gold pounds or their equivalent in dollars or sterling. Until 1948 Aramco made its payments on the basis of the official USA price for gold, which was US $8.24 per sovereign or about US $0.22 per barrel royalty. The government negotiated for the rate based on the price of gold in Saudi Arabia, which was more than twice as high. In 1948 a compromise was made at US $12 per gold sovereign, or US $0.32 per barrel royalty.

Aramco was exempted, under the original concession, from all taxes in Saudi Arabia, including import and export duties. This did not apply to the bringing in of employees, nor to sales of oil within Saudi Arabia. A clause was included in the concession providing that, if payment rates to any other Middle Eastern producer were increased over those in Saudi Arabia, the government had the right to request a proportionate increase.

Effective January 1, 1950, an arrangement for equal division of profits between the government of Saudi Arabia and Aramco was instituted. Previous payments are continued, consisting of a royalty payment of 4 gold shillings per ton or its equivalent in USA dollars at the International Monetary Fund exchange rate of US $8.24 per gold soverign or US $0.22 per barrel, plus any dead rents and/or advances.

The government is now entitled to one-half of Aramco's profits, following deduction of expenses, losses, and "reasonable" depreciation, but not foreign taxes. The difference between the old payments and the one-half of profits is collected by a special income tax called the "supplementary tax." In the calculation of this tax, the tax liability is calculated for 50%, and the amounts of other payments due to the government, including the 20% "ordinary tax," are deducted. These include port charges, import duties, visa fees, etc. If they exceed 50% of net income, the 20% tax is reduced proportionately, but not below the total of rents, royalties, and other payments due—this being the minimum guaranteed payment. Aramco partner companies are given a 2% reduction on their purchases of Aramco crude.

The problem of currencies long has been a major concern to Aramco. If unable to accept anything but dollars for its oil, shipment to most countries would have been drastically reduced. For this reason, provision was made for payment to the government in any currency received from oil sales in the same proportion as such receipts. Should 25% of sales be for sterling, for example, 25% of payments to the government could be in sterling. This agreement enabled Aramco to meet competition from other companies, such as Iraq Petroleum Co., whose production was predominately paid in soft currency.

Purchases of local currency, riyals, for local expenses are at the rate prevaling within Saudi Arabia. Aramco also agrees to pay toward the upkeep of the government representatives concerned with the company's operations. In line with the provisions in Iraq, two Saudi Arabs were nominated to Aramco's board of directors in 1952.

Another problem which may affect regulation of Aramco's activities is the dispute over the Buaimi oasis, the only inhabited spot for many miles in the south of Saudi Arabia, lying on the border between Saudi Arabia and Muscat and Oman. A Saudi official was reportedly trying to win the allegiance of the tribes there. Britain, which has treaty relations with all of the sheikdoms in that area, arranged to have the matter subjected to impartial arbitration; but, late in September 1955, the arbitration tribunal —which was composed of 5 members from Britain, Saudi Arabia, Pakistan, Cuba, and Belgium—had not arrived at a solution because the British member, Sir Reader Bullard, resigned—declaring that the Saudi Arabian member of the tribunal, Sheikh Yusuf Yasin, had compromised the tribunal's position by openly declaring himself to be representing the Saudi Arabian government. This put the proceedings back where they had started a month earlier.

NATIONAL FACTORS

Given the high rate of production from Arabian wells and the extensive reserves, the chief problems of operation now are political. Following the death of King Ibn Saud, his eldest son ascended to the throne. During the recent Suez crisis an embargo was placed by the government on shipments by Aramco to British or French users, and no ships were loaded from Tapline's terminal at Sidon, in Lebanon, on British or French ships or on tankers bound for British or French destinations. The same procedure was followed with tankers loading at Ras Tanura. Shipments via pipeline to the Bahrain Petroleum Co. refinery at Bahrain were also discontinued.

Recent relations were described by a financial advisor to the Saudi government as good, with the qualification that they would be better if the USA had not supported Israel some time ago. He denied any thoughts of nationalization by Saudi Arabia.

An important recent development was the Onassis deal. This arrangement, made January 20, 1952 and amended April 7, 1954, called for the establishment by Mr. Onassis of a tanker company with a minimum of 500,000 deadweight tonnage. All petroleum exports from Saudi Arabia ports were to be made by this company's tankers, excepting those tankers owned by the concessionaire companies, or their parents, and carrying Saudi Arabian oil before December 31, 1943 on a regular basis. The rates to be used for the company tankers were stipulated as those of the London Tankers Brokers Board, although not below levels prevailing April 1942 through March 1954. In return, a fee of 1½ shillings per ton was to be paid the government. The rights under this agreement have never been utilized, and presently are being disputed by Aramco on the grounds that they constitute a violation of the concession's exclusive rights and would operate to raise the price of crude.

The country is highly dependent on petroleum revenues, which mounted to US $112 million in 1950 from US $1.5 million in 1940, US $158 million in 1941, US $160 million in 1942, US $166 million in 1953, and US $260 million in 1954 (including a back payment), and about $275 million in 1955. Despite its large area, nearly one-third the size of the United States, Saudi Arabia has an estimated population of only 5 million to 6 million persons—with a per-capita income, estimated in 1949 by the United Nations, of only US $40, one of the lowest in the world. From 1938, when oil revenues constituted only about 4% of government income, they rose to 50% in 1948, and to 80% in 1952. In 1954 the share of oil revenues was substantially higher because of back payments made by Aramco.

An even larger contribution is made by the oil industry to foreign-exchange earnings of the country. This is estimated as high as 90% of foreign-exchange earnings—derived from oil payments, riyal purchases for local expenditures, and customs duties on employees' needs. As a result of these earnings, which are paid in dollars or in gold for the most part, the Saudi Arabian riyal is the hardest currency in the world; and there are no restrictions on the import or export of capital or profits, nor any other form of exchange control.

Other benefits from the oil industry include employment of Saudi Arabs. Of a total of 21,073 employees on December 31, 1955, more than 65% were Saudis.

Other contributions are made in the field of public health and welfare, including spraying of local villages with DDT to eliminating flies and mosquitos, rodent-control programs, water-well inspection, and other functions. Another contribution is made in providing technical assistance to local projects, free advice and research for private individuals, and supervision of government projects. END

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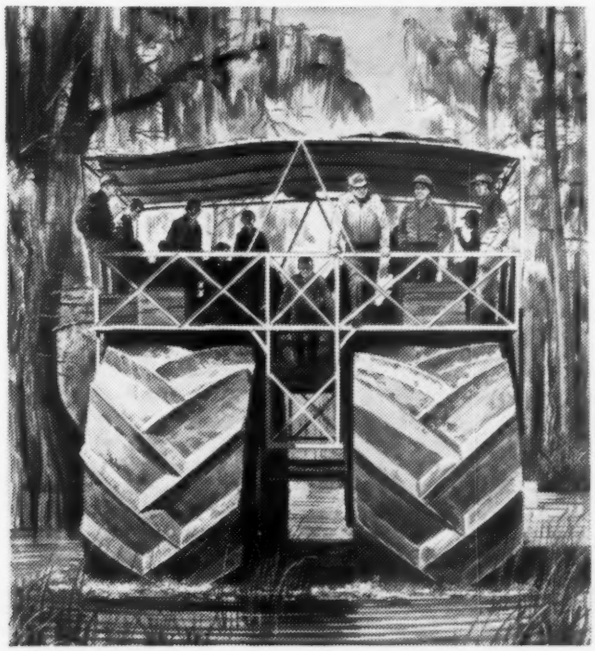

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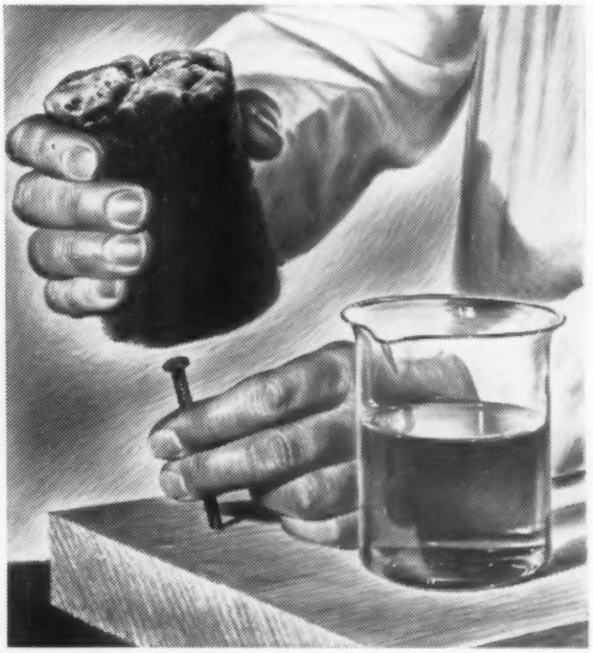

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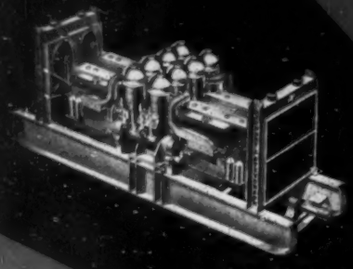

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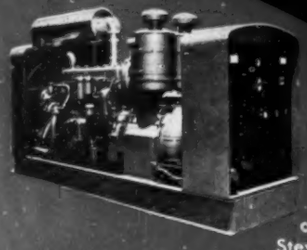

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SPAIN

Exploration

Large-scale exploration first was performed in 1923 by Compania Espanola de Petroleos SA (CEPSA), which entered into a joint operating agreement with Socony-Vacuum Oil Co. (now Socony Mobil) through Compania de Investigacion y Explotaciones Petroliferas SA (CIEPSA). Socony acted as operator. A few wells were drilled, but in 1948 Socony abandoned the operation and subsequently sold its 50% holdings in CIEPSA to CEPSA.

On December 12, 1952 the Spanish government passed a law giving INI (the government development company) exclusive exploration rights within all of Spain except concessions previously granted.

In 1951 INI's mining subsidiary, ADARO, entered into an agreement with the General American Oil Co., of Texas—owned by California Texas Oil Co. (10%); Dallas geological consultants DeGolyer and McNaughton (10%); Delta Drilling Co., of Tyler, Texas (5%); New York investment firm of Bear Stearns & Co. (5%); and Dallas oil man E. E. Fogelson (5%), with the rest owned by other private investors—under the terms of which each party agreed to cover 50% of exploration costs, with INI paying expenses in local currency and getting government facilities, and the American group providing the technical aid and meeting the dollar expenses. If oil in commercial quantities is found, the companies will set up a local Spanish company, in which INI will retain control of production. A formula was set for distribution of petroleum extracted between the two partners.

Exploration has been conducted through a joint company known as Valdebro. Valdebro's first well, Marcilla No. 1, was in the valley of the River Ebro. No oil or gas shows were reported. Valdebro's second well was east of Logrono, on a concession covering some 180,000 acres. Its third well was drilled some 100 miles east of Madrid. No shows of oil or gas were reported from either well. The company then decided on more seismic and gravimetric surveys. Valdebro has three crews drilling at present—one near Ecija, in the Sevilla province; another near Burgos; and a third near El Puerto de Santa Maria, in southwestern Spain. The Ecija well reportedly had some natural-gas shows.

ADARO did some exploration in the Pyrenees provinces of Huesca, Lerida, and Barcelona; in Guadalajare, and in Spanish Morocco; and reportedly found some gas near Guadalquivir and between Giron and Villaviciosa.

CIEPSA now is associated with the German concern C. Deilmann Bergbau GmbH, of Blenheim. Its Gastiain well in Navarra province reportedly showed gas.

Recently the government, under the personal direction of General Franco, began to relax the curbs on foreign ownership of Spanish companies. The former US Under Secretary of State, Herbert Hoover Jr., reportedly was hired by the government to advise on oil matters. The government is interested especially in encouraging the entry of foreign oil capital on the basis of the 50-50 profits split—which, incidentally, would be considerably less favorable than the profits division which the oil law presently calls for.

Production, Refining, Transportation

There is no production of crude oil in Spain. Neither are there any pipelines of consequence—the majority of products being transported by tank car and truck through CAMPSA agencies. A 485-mile products pipeline was being built from Rota on the southeast coast, diagonally across Spain, to Zaragoza—for planned completion January 1, 1957. It will supply USA air bases now being built.

There is also one large refinery in peninsular Spain, located at Escombreras, near Cartagena on the southern coast. It is owned by REPESA (Refineria de Petroleos de Escombreras SA) which, in turn, is owned 24% by Caltex Products Co., 52% by INI, and 24% by CEPSA.

Refining runs for Spain, excluding the Canary Islands, during 1955 averaged 41,400 b/d.

Marketing

Since there is no domestic production, the internal market of Spain is supplied by imports. Most imports are a monopoly by CAMPSA. In 1955 consumption was 63,200 b/d, about 18.4% over 1954; 55% of 1955 consumption was fuel oils.

A topping plant owned by CAMPSA (Compania Arrendataria del Monopolio de Petroleos SA), near Barcelona, has about 250 b/d capacity; and a shale-oil distillation plant, owned by the Penarroya Co., has a capacity of about 125 b/d. Refining capacity in 1960 is to reach 120,000 b/d. A 15,000 b/d refinery is under construction by the government at Puertollano.

OIL LAWS

Exploration and development in Spain are governed by the basic mining law of December 29, 1868, as amended by the law of July 19, 1944—with regulations of the decrees of August 9, 1946 and December 16, 1952. The Law for Protection of National Industries of November 24, 1939 limits foreign participation in mining (including petroleum) companies to 25% (or 49% ownership in cases of national interest, and with permission of the Council of Ministers). Officials of mining companies may be foreign in proportion to ownership, but the president and board of directors must be Spanish. An important exception to this ownership rule may have been made in 1952 under the "Valdebro contract" previously mentioned.

Operations under the law are divided into prospecting permits and exploitation concessions. The controlling government agency is the Bureau of Mines of the Ministry of Industry.

EXPLORATION: The minimum area for the exploration concession is 1,000 "pertenencias" (2,471 acres). There is no maximum area given in the law, nor any known limitation on the number of exploration concessions which may be held by one individual or company.

Initial duration of the concession is three years, extendible for another three years, provided work has been carried on in accordance with plans and conditions as approved by the Bureau of Mines.

Exploration operations must begin within six months of granting of the concession.

Fiscal obligations of the exploration concession include an annual surface tax amounting to one-half that of the exploitation concession, or three pesetas per hectare annually (three USA cents per acre).

EXPLOITATION: A concession may be applied for only when existence of petroleum has been proved. There is no limit on the term of the exploitation concession. It may be surrendered at any time. The government may require crude produced to be refined within the country.

Fiscal obligations of the exploitation concession include all general taxes, plus a special surface tax on the concession area of 6 pesetas per hectare (6.4 USA cents per acre) per year.

A 5% royalty is payable on production, in accordance with the law of February 8, 1946.

No special concession for transportation is required—only special authorization from the Ministry of Industry and Commerce.

SPECIAL CONTRACTS: The "Valdebro contract" between General American and INI constitutes a special case. The limitations on ownership by foreigners outlined hereinafter evidently were abandoned in favor of joint 50-50 participation. Reports indicate that Valdebro will receive 6% interest on capital invested, pay a 5% royalty, and have the right to sell production to CAMPSA for dollars.

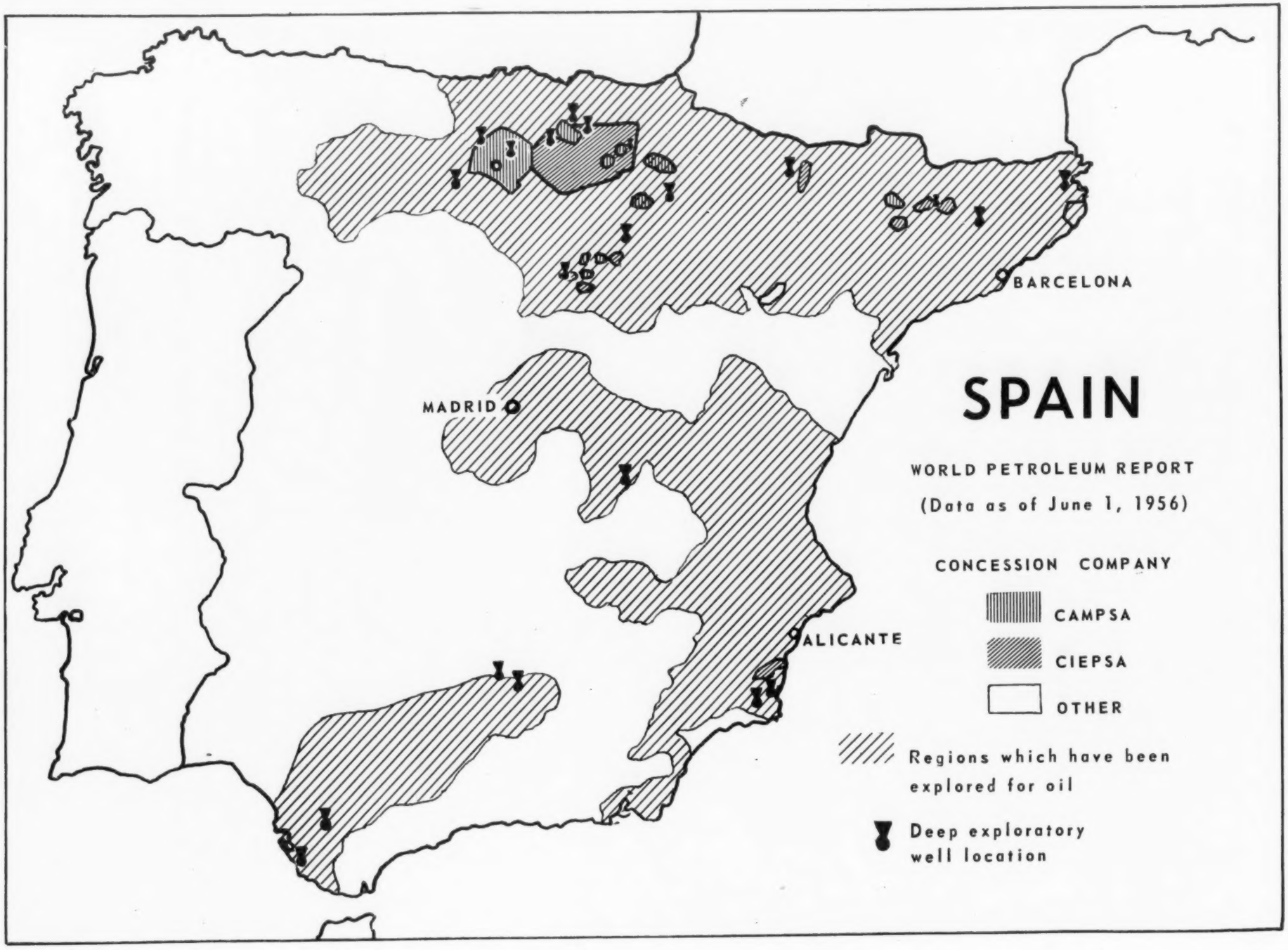
TABLE I—SPANISH REFINERIES

Company		Crude Capacity	Cracking Capacity
CAMPSA Cia. Arrendataria del Monopolio de Petroleos SA	Barcelona	250 S	—
CEPSA Cia. Espanola de Petroleos SA	Canary Islands[1]	35,000 Comp.	3,500 T
Refineria de Petroleos de Escombreras SA	Escombreras[2]	45,000 SL	—

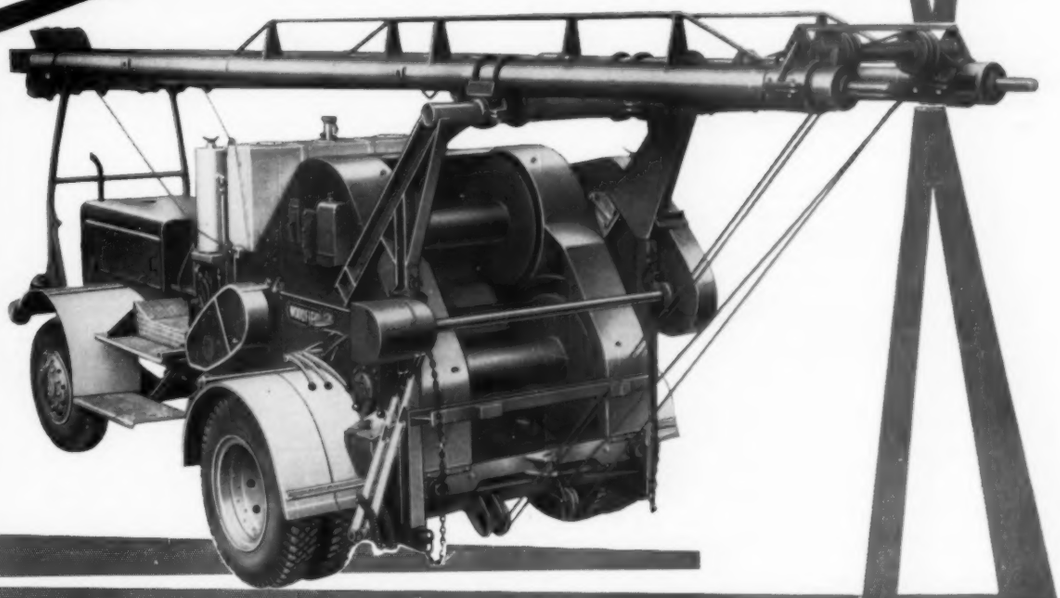
(1) 5,000 b/d Platforming capacity.

(2) 8,500 b/d thermal reforming capacity. Under construction: 23,000 topping plant; 8,000 Platformer—scheduled for completion 1957. 4,500 b/d LP-Gas plant completed late 1955.

S—Skimming plant. L—Lube plant. Comp.—Complete. T—Thermal.


BARCELONA
MADRID
ALICANTE
SPAIN
WORLD PETROLEUM REPORT
(Data as of June 1, 1956)
CONCESSION COMPANY
CAMPSA
CIEPSA
OTHER
Regions which have been explored for oil
Deep exploratory well location

Fieldmaster



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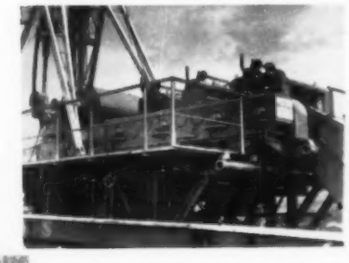
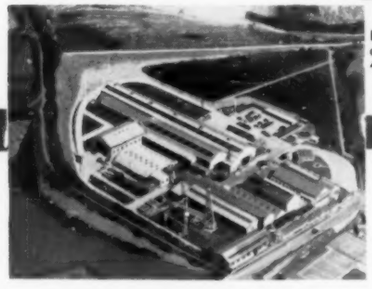
Rochester plant, which is constantly developing and enlarging its production and design capacities.

Ideco/Woodfield Hydrair H-525 Dual Rambler Rig with KM 105 K wik Lift mast. Hook load 258,000 lb.





Ideco/Woodfield Hydrair H40-D Double drum draw-works, with 3 A.E.C. Engines, 450 h.p., and four-shaft drive compound.

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NATIONAL FACTORS

Spain has been politically stable since the end of the civil war in 1939. Economically, however, the country is undeveloped and badly in need of investment capital.

The attitude of the Spanish government toward investment of foreign capital has been restrictive. The limitations on foreign participation previously noted permit, at their best, 49% ownership. Some encouragement of investment is given industries increasing Spanish self-sufficiency or working for national defense; these receive a reduction of 50% to 100% on import duties on machinery imported and a similar reduction in general taxes. In addition, such companies may be guaranteed a return of 4% on capital invested, provided 50% of profits over 7% be turned over to the government.

The labor situation within Spain is quiet. There are practically no labor unions, and strikes are illegal. The total of labor legislation makes hiring and dismissal of workers cumbersome, and results in an indirect increase to the basic wage rate. Recent data on warge rates are not available, but statistics indicate a range for mining workers of 40 to 50 pesetas per day, or an average daily wage of $1.25. Rates in metallurgy and agriculture were somewhat lower.

The basic unit of currency is the peseta, valued at 39.65 pesetas per dollar, or 2.522 USA cents per peseta, which is the free rate which would apply to dollar purchases and payments for oil operations. There is no guarantee of profit remittance nor capital repatriation available from the Spanish government; nor does the MSA guarantee system apply.

Taxation of corporate profits in Spain ranges from 16%, when the profits are 4% of capital or less, to 37% when profits exceed 15% of capital. There is also an excess-profits tax ranging from 40% where excess profits represent 10% or less of capital, and graduating to 80% on profits exceeding 60% of capital. There is an 8% tax on dividends when income does not exceed 4% of capital, graduating to 25% when income exceeds 25% of capital. Other taxes are minor. A treaty for avoidance of double taxation with the United States has been proposed. END

TABLE II—SPANISH PETROLEUM TRADE
(Metric Tons)

	IMPORTS			EXPORTS		
	1954	1955	%	1954	1955	%
Gasoline	121,346	65,218	—46.4	51,359	70,821	+52.3
Kerosine	42,981	66,145	+53.9	24,938	24,363	— 2.3
Diesel	1,029,448	408,094	—60.4	1,150,302	704,872	—38.7
Lubes	75,590	71,819	— 5.0	354	341	—
Crude	2,590,668	2,785,948	+ 7.5	1,171	—	—
Fuel oil	936,068	694,498	—25.8	867,624	242,398	—72.0
Asphalt	4,855	3,400	—30.0	360	308	—14.5
Vaseline	630	1,100	+73.4	—	—	—
Paraffin	1,770	1,541	—12.9	—	—	—

TABLE III—SPAIN—PETROLEUM STATISTICS
(Thousands of Barrels)

		Imports		Exports			
Year	Production	Crude	Products	Crude	Products	to stills Crude Runs	Consumption
1929	—	NA	5,153	—	—	—	5,153
1934	—	NA	6,821	—	—	—	6,821
1938	—	300	4,200	—	—	300	4,500
1944	—	NA	4,000	—	—	NA	4,000
1945	—	670	3,893	—	330	670	4,233
1946	—	NA	5,943	—	—	NA	5,943
1947	—	NA	7,580	—	—	NA	7,371
1948	—	NA	7,371	—	—	NA	7,580
1949	—	NA	8,775	—	—	NA	8,775
1950	—	2,108	8,210	—	—	2,010	10,220
1951	—	2,616	NA	—	—	2,642	10,812
1952	—	6,727	NA	—	NA	6,590	12,560
1953	—	11,191	NA	—	NA	10,480	13,791
1954	—	13,278	NA	—	NA	13,223	17,360
1955	—	16,169	NA	--	NA	15,111	23,068

NA—Not available.

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SWITZERLAND

There is no production nor refining in Switzerland. Petroleum activities are confined to exploration and to marketing.

Exploration

Most of northern and northeastern Switzerland lies in the Molasse basin, which extends from Austria and southern Germany, where discoveries have stimulated some interest. A few wells have been drilled in Switzerland—all of them dry. The latest was located 18 miles north of Altishofen in the canton of Lucerne. Some gas and oil shows were encountered between 6,890 ft and 7,200 ft early in 1953. Some drilling was done before 1949 on another concession held by a Swiss geologist, Dr. J. Kopp, and Swiss capital—without success.

Molasse Oil Explorations, a Swiss-registered company in which the USA oil company Heathman-Seeligson Drilling Co. has a majority interest, recently received a concession. The cantonal government of Tessin, near the Italian frontier, has asked for an appropriation of 300,000 Swiss francs (about $85,000) to conduct exploration work itself.

Another recent concession was awarded, June 8, 1956, to Ste. Suisse Mittelland SA, owned 75% by Swiss interests and 25% by Mr. Roger Henquet, a French citizen. The area covered is in the extreme southwest of the canton Vaud.

Six cantons have agreed upon a concordat, under which an exploration concession may be granted to Schweizerische Erdöl AG. The German oil company Gewerkschaft Elwerath has agreed to act as operator in return for a 25% capital participation. The cantons each would be entitled to acquire a small interest in the company.

Another concordat, to comprise the cantons of Lucerne, Berne, Schwyz, and Zug, is expected to be broadly similar. Again, a German company, Wintershall AG, would act as operator, in return for 25%.

The Swiss are not disposed to grant an oil, or any other mining, concession directly to any large foreign corporation; and, under the terms of the concordat, not more than 25% of the capital of any concessionaire company may be foreign—a condition which virtually rules out participation by any of the large international companies.

Refining, Marketing

There are no refineries in Switzerand. The only previously existing refinery was at Rotkreuz; it recently was dismantled and set up in Egypt by the National Petroleum Co. Neither are there any refineries planned at present, so far as known. There are three plants manufacturing synthetic fuel.

Marketing of petroleum is confined approximately 76% to the midlands area, according to the Swiss government. In 1955 consumption of all petroleum products was 1,945,000 metric tons, or about 27,301 b/d. The same sources estimate a 15.1% increase in 1956—to 2,240,000 metric tons, or about 42,958 b/d.

OIL LAWS

There is no federal legislation governing exploration or exploitation of petroleum in Switzerland. The regulation of these activities is the exclusive competence of the cantons, despite an attempt by the federal government in 1952 to unify treatment of petroleum investors.

Several of the cantons—including Zürich, Berne, Solothurn, St. Gallen, Appenzell, Rhodes-Intérièures et Extérièures, and Thurgau—all located in northern-Switzerland, joined in 1955 to draft a concordat or common oil law. Concessions for exploration or exploitation would be given under terms administered by an intracantonal commission, and could cross cantonal boundaries freely. The terms of the exploration concession would be determined largely at the time of application, but exploitation rights would have an 80-year duration maximum. Royalty is not specified other than its division three-fifths to the canton in which production occurs, the remainder being divided among the other cantons in the concordat. The cantons themselves are authorized to acquire up to a 25% interest in the operation. Foreigners would also be limited to a 25% interest. This concordat has not yet become law.

EXPLORATION (Geneva): The only canton with special provisions for hydrocarbons is Geneva, in its mining law of May 8, 1940.

The exploration permit in Geneva covers exploratory drilling, grantable only on evidence of the existence of a petroleum "deposit." Duration is two years, with two extensions possible of two years each. The maximum area is 500 hectares (1,235 acres) per concession. More than one concession may be given to the same person or company.

A drilling obligation is imposed of 350 meters (1,148 ft) per year for the first 2 years, or one well of at least 1,000 meters (3,280 ft) during the entire 2-year period. Personnel employed must be at least 75% Swiss, domiciled in the canton of Geneva at least 2 years before concession date. Technical direction must be 75% Swiss. The concession may be transferred only with the express authorization of the Department of Public Works.

Fiscal obligations of the concession are not defined.

EXPLOITATION (Geneva): The exploitation concession has a duration of 25 years. It may be renewed at the end of that time on conditions fixed by the canton.

Conversion procedure from exploration to exploitation concession is as follows: The maximum area of the concession is 50 hectares (124 acres), centered around the original producing well and contained within the limits of the exploration concession from which it is derived. On conversion of the exploration concession, the 50 hectares become the exploitation concession. The remaining 450 hectares are divided into 2 lots—the first being 250 hectares surrounding as closely as possible the development concession. A new exploration concession will be issued on this lot with a term of 2 years and a drilling obligation of 250 meters per year. Concessions derived from this lot are subject to a double fee and a proportional simple fee. The second lot will comprise the 200 hectares remaining, on which the exploration concessionaire will receive a new exploration concession with a term of 4 years and a drilling obligation of 200 meters per year. Concessions granted from this lot will be subject to a double fee, and the canton will have the right to 50% of the product of the concession. The government may require that all refining be done in Switzerland, or in the canton, as soon as production reaches a level to be specified in the concession. The concessionaire may not transfer nor surrender the concession without the permission of the government.

Fiscal obligation of the development concession includes an annual tax of 200 Swiss francs (US $50) per well. There is a royalty imposed of 15% on crude and on products manufactured and sold.

The remaining cantons of Switzerland govern petroleum activities only through general mining or other laws.

NATIONAL FACTORS

The tradition of Swiss neutrality has made the federal government extremely unwilling to grant any rights which might damage that neutral position. As a result, the recently proposed concordat between several of the cantons specifies that only 25% may be held by foreign interests, and the government circular of 1952 incorporated the requirement that no oil company having majority foreign government participation may hold petroleum rights.

Other aspects of investment in Switzerland are more encouraging. The Swiss franc, which has a value of about 25 US cents, is among the soundest currencies of the world, and there is neither exchange control nor limitation on the import or export of capital or profits.

Federal taxation of corporate income in Switzerland is graduated up to 12%. A 20% surtax on net profits over $1,155 is levied on corporations, A 5% coupon tax is assessed on dividends and interest as well. Cantonal taxes run from 10% of profits plus 10% of the amount of the tax in the canton of Zürich to 20.5% of profits in the canton of Berne. Such direct taxes are constitutionally the right of the cantons.

END

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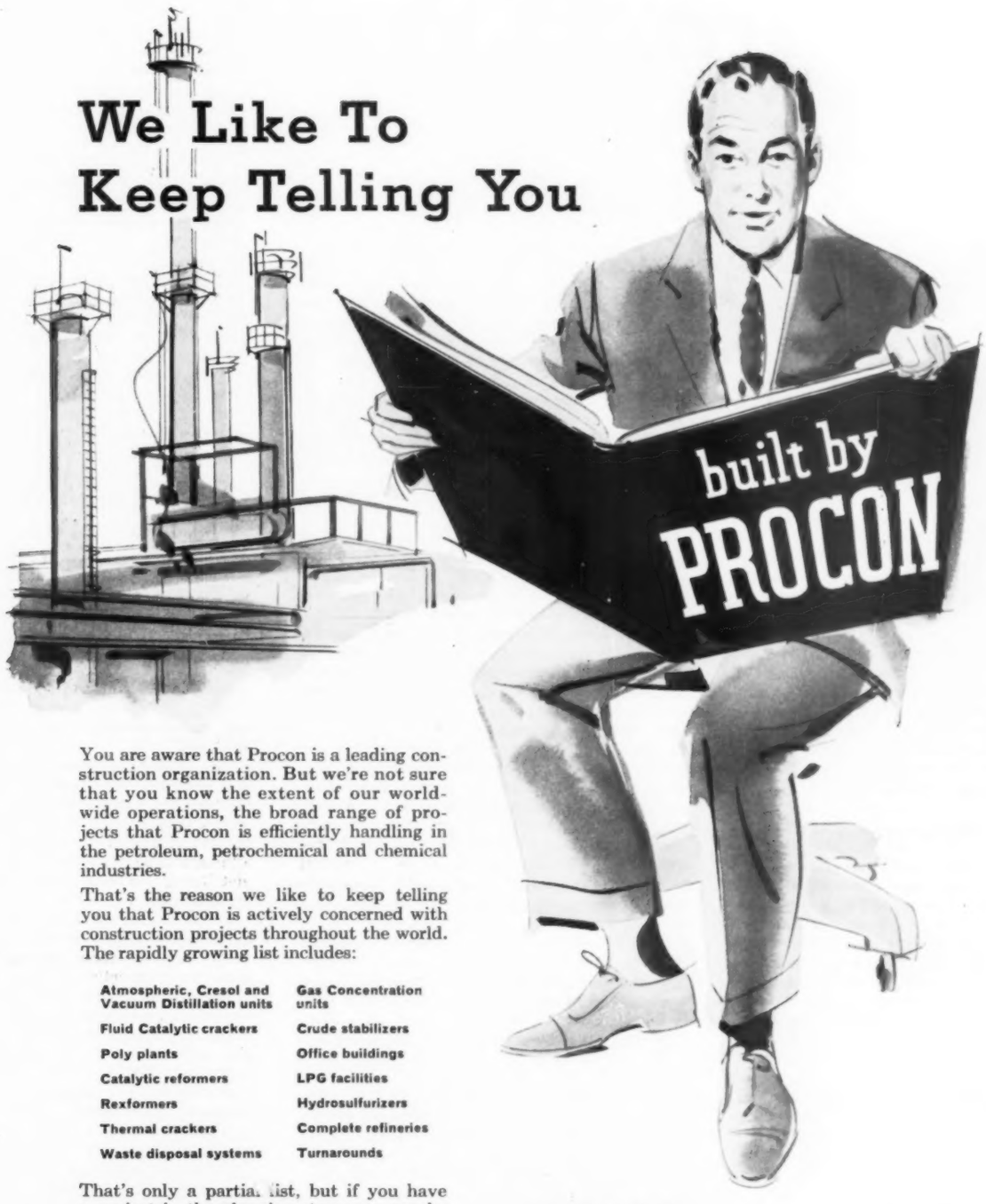

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SYRIA

Exploration

Syria Exploration Co., a subsidiary of Iraq Petroleum Co., formerly had a concession covering all of Syria north of the latitude of Damascus, given up in August 1951. Ten wells were drilled. One, Ghouna No. 1, found some natural gas in small amounts. The remaining wells were dry. The deepest went to 10,163 ft.

On May 16, 1955 an exploration concession was given to James W. Menhall, owner of the J. W. Menhall Drilling Co., of Benton, Ill. Area covered was 28 tracts, of 300 km each—half of which was given up later—scattered through the northern part of the country. He began his first exploratory well only a few feet from the original IPC drilling site. This well reported commercial shows at 6,640 ft in October 1956. It is known as Caratchok Dagh No. 1, located in the northeastern tip of Syria at Caratchok Dagh, about 2 miles from the Tigris River and near the Turkish border. During March a syndicate headed by Cyrus S. Eaton, chairman of Chesapeake and Ohio R.R., reportedly put up $200,000 in exchange for one-third interest in the Menhall company.

A total of 49 exploration permits, covering 5,791 square miles, has been given to Ste. des Pétroles Concordia-Damascus, associated with Deutsche Erdoel Co., of Hamburg, Germany. Drilling was to begin in 1956.

Production and Refining

There is no production of crude oil in Syria at present, nor are there any refineries. A 20,000 b/d refinery has been authorized by the government, to be constructed by the Syrian National Development Board, at Homs. Expenditure is estimated at around $35.5 million. The government called for bids, and reportedly received responses from Czechoslovakia, as well as from several US concerns. Standard Oil Co. (New Jersey) offered to build a refinery, at company expense, to provide products for local consumption, but no government approval has been received to date. The date of construction and identity of constructing firms remain to be determined.

Transportation

Syria lies on the route of the world's greatest crude-oil pipelines, transporting from Iraq and Saudi Arabia to the Mediterranean.

Tapline recently began to raise capacity of its pipeline by installing four new pumping units. When these are completed, the line's capacity will be 410,000 b/d. Its size permits of eventual expansion to 500,000 b/d by addition of still more pumping units.

Plans for considerable enlargement of IPC's lines had been under way, but during November 1956 the 3 pumping stations of IPC's lines in Syria were sabotaged, reportedly by Syrian soldiers; and it is doubtful that any additions will now be made.

Marketing

Marketing of petroleum products within Syria is derived totally from imports. The majority (63%) comes from Lebanon where, in accordance with an agreement between the Iraq Petroleum Co. and the Syrian and Lebanese governments, Syria obtains 59% of the kerosine, 48% of the gasoline, and 62% of the gas oil produced by Tripoli refinery.

The production of the Tripoli MEDRECO refinery is divided among the distribution companies. All prices and distribution activities are closely controlled by the Syrian government.

OIL LAWS

Petroleum development and exploration are governed by the Mining Law of December 21, 1953 and its regulations in Decree 294 of January 20, 1954. All subsoil rights are reserved to the State. The law is unusually restrictive in that all operations must be carried out by Syrian companies or by companies established in Syria and conforming to the requirements of Decree 151—which means that exploring companies must have two-thirds of their capital subscribed by Syrians and that a majority of the directors must be of Syrian nationality.

EXPLORATION: Exploration operations are divided into a reconnaissance permit, which covers geological reconnaissance and has a term of one year, renewable for an indefinite number of times, and an exploration permit. Duration of this permit is four years, with the right to one renewal for an equal period. The maximum area per concession is 300 sq km (115.8 square miles).

Payment of 100 Syrian pounds (US $45.50) is made for the reconnaissance permit, with 200 Syrian pounds ($90.80) during renewals.

The exploration concession pays yearly 1,000 Syrian pounds ($454) during the first year; 2,000 pounds ($908) during the second year; 3,000 pounds ($1,362) during the third; 4,000 pounds ($1,816) during the fourth; 6,000 pounds ($2,724) during the fifth; 8,000 pounds ($3,632) during the sixth; 10,000 pounds ($4,540) during the seventh; and 12,000 pounds ($5,448) during the eighth and any years thereafter. Annual surface tax is 25 Syrian pounds per square kilometer ($0.045 per acre).

EXPLOITATION: The development concession is guaranteed to the holder of an exploration concession over the same area. Area, duration, and other terms are not spelled out in the general law.

Whatever the fiscal requirements may be, they cannot be less than 50% of the net profits of the developing company.

Pipeline operations in Syria are governed under separate concessions for Tapline and IPC. Revisions recently were asked by the Syrian government aimed at "half of the extra profits made by the oil pipeline companies from use of the pipelines instead of . . . sea route." This means that the difference between the Persian Gulf price and the Mediterranean terminal price (about 48 US cents per barrel) would be taxable after deduction of operating costs, including amortization.

On November 26, 1955 a new agreement with IPC gave Syria 6.5 million pounds sterling during 1956 for the transit of approximately 26 million tons of oil, or about 10 US cents per barrel transported. The total is composed of a payment of one shilling four pence per 100 ton-miles; one shilling one pence per ton in port dues; and eight pence per ton in security charges and other fees. The port and terminal fees apply only to that part of IPC's production which goes to the Banias terminal, or about 17 million out of the expected 26 million tons. The remainder will be subject only to the pipeline transit charge. In addition, IPC made a back payment of 8.5 million pounds sterling.

Tapline proposed to set up a profit-making company to manage the pipeline and split profits 50-50 with the 4 countries involved, viz., Syria, Lebanon, Saudi Arabia, and Jordan—profits to be figured on the difference between crude selling price on the Mediterranean and the Persian Gulf. This would leave about $16 million to be divided among the 4 countries. All have agreed to the formula, but have not yet been able to agree on a method of division of the income between themselves.

NATIONAL FACTORS

The attitude of the government in the past has not been inviting to foreign investors. In 1952 Decree 151 specified that all subsidiaries of foreign corporations must have a majority of Syrians on their boards of directors and a Syrian president. Petroleum companies are subject to all these requirements, but they have not been enforced. Additionally, there have occurred several instances of nationalization, including two French and one Belgian company, and compensation therefor has not yet been achieved.

The political situation is chronically unstable, and presently very hostile toward the West. A military coup is feared under Lieutenant Colonel Abdel Hamid Serraj, chief of army intelligence. He is pro-Nasser and pro-Soviet, although not considered a communist. The Soviet Union has been sending large quantities of arms to Syria.

There is no restriction on the repatriation of profits and the amortization of capital, and these may be effected at any time. Neither is there any restriction on the import of capital, although the establishment of a new business necessitates a license from the government.

The official rate is 2.19 Syrian pounds buying and 2.21 selling, or US $0.456 to $0.452. This is the rate which the oil companies presently operating in Syria have been compelled to use. However, there exists a legal free rate, which is about 3.575 Syrian pounds per US dollar, or US $0.266 per Syrian pound.

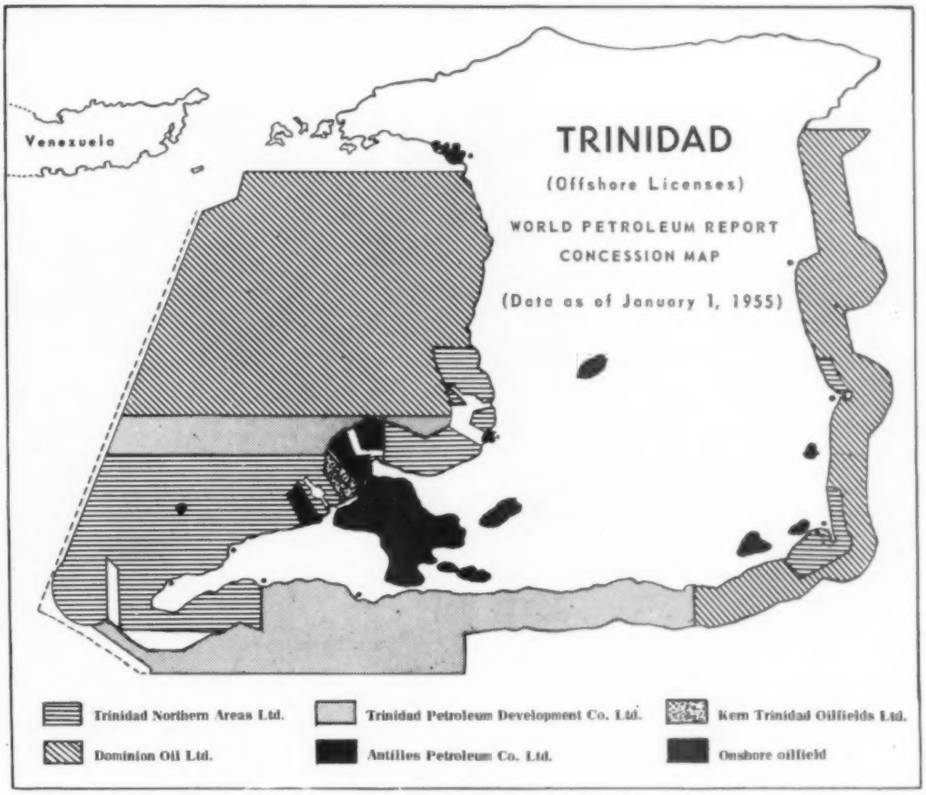
The requirements of labor legislation are not excessive. Governmental legislation forbids strikes, and unions are forbidden to enter into political affairs. There has been little labor agitation to date, and no major strikes recently.

The petroleum companies' minimum wage until recently was 225 piasters for unskilled workers (US 67 cents) and 850 piasters daily (US $2.25) for skilled workers. These rates were set by the Wage Limitations Committee for Homs, and have been raised slightly since.

Taxation rates are substantially lower than in the United States. The income tax begins at 6% on profits of 1,500 Syrian pounds (profits are exempt), and rises to 36% on profits in excess of 750,000 Syrian pounds (US $204,000).

END

TRINIDAD



Exploration

The outstanding recent exploratory development has been the discovery of an offshore well by Trinidad Northern Areas Ltd., a subsidiary of the Royal Dutch-Shell group; D'Arcy Exploration Co. (British Petroleum); and Trinidad Petroleum Development Co. Ltd. This well, the first offshore producer for Trinidad, was begun in the summer of 1954 in the Gulf of Paria, 6 miles off Cedros Point on the southwestern corner of the island. It was completed as a "typical Trinidad well" in mid-1955. Production was reported, in the press, at 160 b/d—far above the Trinidad average production per well. Two deviated wells were drilled from the offshore platform during 1956. Trinidad Northern Areas brought in Fortin No. 11, offshore, as a dual completion.

Trinidad Oil Co. (formerly Trinidad Leaseholds) was purchased by The Texas Co. during 1956. Another USA firm, Colorado Oil and Gas, of Denver, Colo., was outbid by British Petroleum Co. for Trinidad Petroleum Development.

Production, Refining

Crude production within Trinidad rose to about 79,000 b/d in 1956. The largest of the producing companies are Trinidad Leaseholds (now Trinidad Oil), United British Oilfields, Trinidad Petroleum Development Co., and Apex (Trinidad) Oilfields, Ltd. Production is principally from old, developed areas, and is maintained only by extension and more intensive drilling.

Cumulative production to January 1, 1956 was 526,896,000 bbl. Gas production during 1955 was 40,772 mmcf for the year, making the cumulative total 797,488 mmcf to January 1, 1956. Proved reserves, as of January 1, 1956, were 280,000,000 bbl.

TABLE I

TRINIDADIAN CRUDE PRODUCTION—1956

(Thousands of Barrels Per Day)

January	72.4	July	81.1
February	75.2	August	79.0
March	75.5	September	81.7
April	76.6	October	82.1*
May	77.5	November	84.5
June	77.5*	December	85.0
		Year	79.0*

*Estimate.

Marketing

Domestic consumption of petroleum within Trinidad and Tobago was approximately 29,440 b/d during 1956. Consumption in 1960 is estimated at 30,360 b/d.

Despite high production levels, Trinidad is a large importer of finished products.

OIL LAWS

Petroleum rights are principally provided for in the Land (Oil Mining) Regulations, of December 7, 1934, as amended August 15, 1934, December 24, 1936, November 2, 1937, April 8, 1940, January 2, 1942, May 6, 1942, June 6, 1945, November 27, 1945, and Amendment Regulations of 1952.

EXPLORATION: An exploration "license" has a duration of two years. It covers geological and geophysical work, but not wells more than 20 ft deep. The minimum area is 500 acres; maximum is 100,000 acres. There is no limitation on the number of licenses which may be held at one time by the same person or company. Operation must begin within three months. Transfer of the license is subject to the governor's permission.

Fiscal requirements of the exploration license include a filing fee of 5 British West Indies dollars (abbreviated BWI $) or $2.92 for crown lands and BWI $20 ($11.67) for alienated lands. Annual rental per concession becomes less with increasing size, viz., from approximately 28 USA cents per acre for an exploration concession of 999 acres to 5 USA cents per acre for a concession of 100,000 acres.

EXPLOITATION: An oil mining lease is grantable to the holder of an exploration license, and may cover as much of the area thereof as desired by the licensee. It may also be applied for directly. Duration is 30 years, extendible at the lessee's option for 30 years. On extension, the fiscal obligations may be increased. There is no drilling obligation.

A refinery must be built within two years when production passes a certain limit, and capacity must be maintained equal to 50% of production. The lessee has the right of voluntary surrender on six months' notice.

Annual rental per acre ranges from 56 USA cents per acre during the first year to $2.10 per acre during the sixth and succeeding years. Rentals are creditable against royalties paid during the same year. On extension of the concession, the rentals may be increased up to 50%.

Royalties vary from 10% to 12½% on production over 550,000 barrels during a half-year period.

On natural gas produced and sold, the royalty rate is 1.5 BWI cents per mcf.

Special provisions apply to submerged areas. Exploration and development concessions are merged in a single license of the same duration (30 years) as the onshore leases, and with right to 30 years' extension. Minimum area is 675 acres. Royalty ranges from 10% to 12½% on production in excess of 600,000 bbl during the half-year royalty period. Surface rentals vary from 5.8 USA cents per acre during the 1st year to BWI $1.80 (USA $1.05) per acre during the 10th year and thereafter. Rentals are deductible from royalties.

Depletion allowance for offshore production ranges from 10% on production during the 1956-60 period to 15% during the 1961-65 period, and 20% during the period from 1966 through 1982.

NATIONAL FACTORS

The British West Indies dollar is tied to the British pound at 4 shillings 2 pence per BWI $1.00, or a value at the official sterling rate of 58.33 USA cents. Any company producing in Trinidad is subject to sterling-area restrictions on remittance of profits and repatriation of capital.

The corporate income tax is a flat 40% on net profits, with no provision for a depletion allowance on onshore production. END

TABLE II—PETROLEUM REFINERIES IN TRINIDAD

Company	Location	Crude Capacity	Cracking Capacity
The Texas Co.[1]	Brighton	5,000 S	—
Trinidad Oil Co. Ltd.	Point-a-Pierre[1]	85,000 SCA	48,500 TC
Shell Trinidad Ltd.	Point Fortin	35,000 SA	—

(1) 36,000 b/d thermal cracking capacity and 22,500 b/d catalytic cracking capacity.
S—Skimming C—Catalytic Cracking T—Thermal A—Asphalt

TURKEY

Exploration

Until early in 1954, when a new petroleum law became effective, exploration in Turkey was a monopoly of the government's Mining Research and Exploration Institute. By March 1, 1956, with the passage of the Amendment Law of 1955 and Regulations under Petroleum Law of March 7, 1954, 12 companies had applied for 141 exploration licenses (indicated on the accompanying maps), having previously done some reconnaissance work under special permit. Subsequently Seaboard Oil of Delaware and Atlantic Refining joined Tidewater in exploration.

The country has been divided by the Petroleum Law into nine zones, indicated on the map by roman numerals. Esso Standard (Turkey) Inc., owned by Standard Oil Co. (New Jersey), was granted four licenses in District I, eight in District II, six in District V, seven in District VI, and two in District VII. Bataafsche Petroleum Maatschappij, of the Shell group, was granted five licenses in District I and eight each in Districts V and VI. Tidewater Oil Co., an American independent, received three licenses in District I, eight in District V, and six in District VI. D. D. Feldman Oil and Gas Inc., also an American independent, received one license each in District VI and District VII, and two licenses in District VIII.

Districts III and IV have been declared partly closed to exploration by the Council of Ministers.

Turkyie Petrolleri AO, or Turkish National Oil Co., which is owned 51% by the government of Turkey and 49% by private Turkish capital, received two licenses in District I, one in District III, six in District V, five in District VI, and one in District VII. Seven companies which had applied before October 15, 1955 received licenses later because of overlapping. They included Mobil Exploration Mediterranean, a subsidiary of Socony Mobil, with eight licenses each in Districts V, VI, and VII; Gilliland Oil Corp., a USA independent with one license each in Districts V and VII; Bolsa Chica Oil Co., an American independent with three licenses in District V and two in District VII; and the Istanbul Tabii Gas Lts. Sirketi or Istanbul Natural Gas Co., which is owned by the Ralph M. Parsons Co., the Istanbul Elektrik ve Gas, and the Turkiye Petrolleri AO, with four licenses in District I and one in District VII.

In Thrace or European Turkey, in District I, Husky Oil Corp., a US independent, holds four licenses; and the German firm, C. Deilmann Montan GmbH, also received four licenses. American Overseas Petroleum Ltd., owned by California Texas Oil Co., received five licenses in District I and eight in District VI.

Husky Oil Co. has transferred its exploration rights to Marmora Petroleum Corp., a subsidiary; and Mobil Oil Turk AO has transferred its licenses to Mobil Exploration Mediterranean.

Gilliland Oil spudded in an exploratory well during October 1956 in the Adana basin of the Iskenderun Gulf area along the Mediterranean Sea. There are two known structures in Gilliland's exploration areas, one known as the Rubaikale structure near the border of Iraq. The other is on the coast, and is an anticlinal structure lying partly offshore.

American Overseas Petroleum Ltd., a Caltex affiliate, will drill a wildcat about 18.6 miles from Gaziantep in southern Turkey during 1957.

Previous exploration carried out over 20 years by the government monopoly has been concentrated in southeastern Anatolia, particularly Ramandag district.

Production

Production to date has been in the Ramandag area in southeastern Anatolia in the Raman and Garzan fields. There has been no commercial production from the Garzan field, which was discovered in 1950. During 1955, production from the Raman field was 3,500 b/d. Total cumulative production since discovery in 1948, and through 1955, was 2,380,000 bbl.

The potential of the Raman field is estimated at over 7,000 b/d, but it is held in by lack of transportation and refining facilities. During early 1955 the completion of the Batman refinery lifted production to about 6,000 b/d, and to 7,100 b/d in October 1956.

Refining

A new refinery at Batman, which was completed in December 1955, is the only large one in Turkey. It is owned 55% by the government, and its operation is considered entirely separate from the policy of encouragement of foreign private investment in exploration and development. The refinery utilizes crude from the government's Raman and Garzan fields, and has a capacity of 6,250 b/d, which goes mainly to the consuming needs of the surrounding 19 provinces which are relatively isolated, due to topography. There has been a small topping plant in operation at Batman since 1949. Throughput is small, about 250 b/d.

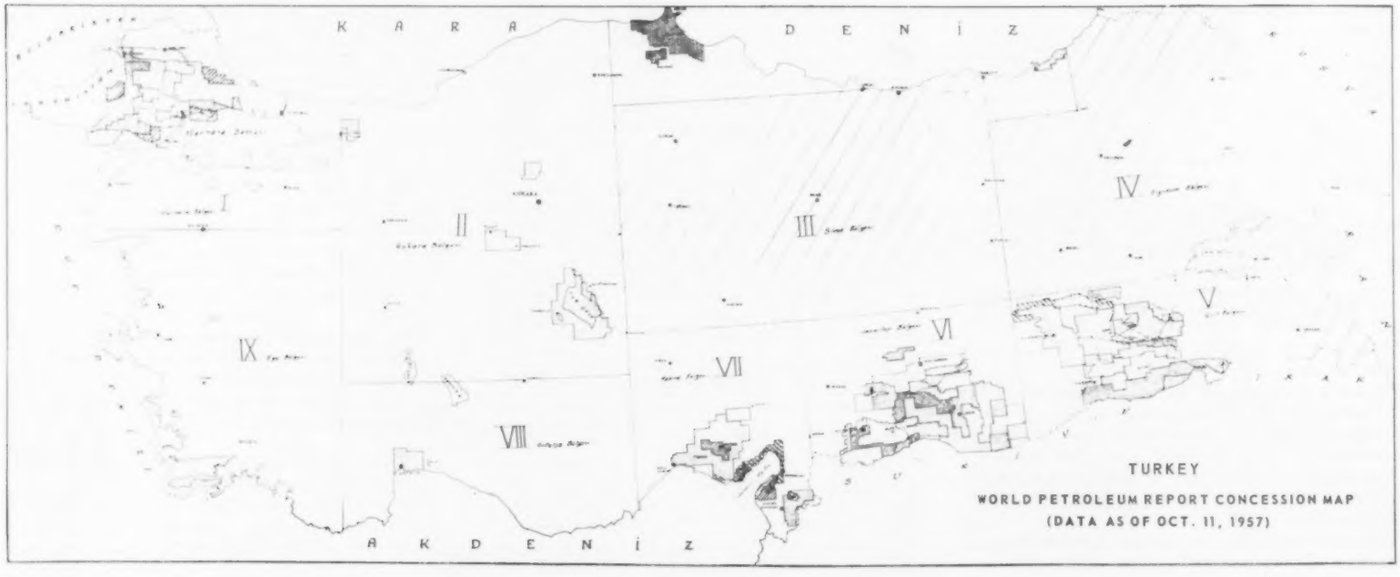
The new Batman plant produced about 5,700 b/d during the first half of 1956. Yields were 3,570 b/d of fuel oil, 1,250 b/d gasoline, 270 b/d diesel oil, and 640 b/d of asphalt. This operation is at about 88% of rated capacity of about 7,000 b/d.

The 15,000 b/d refinery planned by Turkish American Oil, an independent company, will begin construction in 1957, according to the owners. A fluid catalytic cracking unit of 4,900 b/d, a 2,400 b/d vis-breaking unit, and a 480 catalytic polymerization unit will be included. Yield is expected to be 39.4% 85-octane (research) gasoline, 19.8% kerosine, 19.5% diesel fuel, 16.2% heavy fuel oil, and 4.1% LPGas.

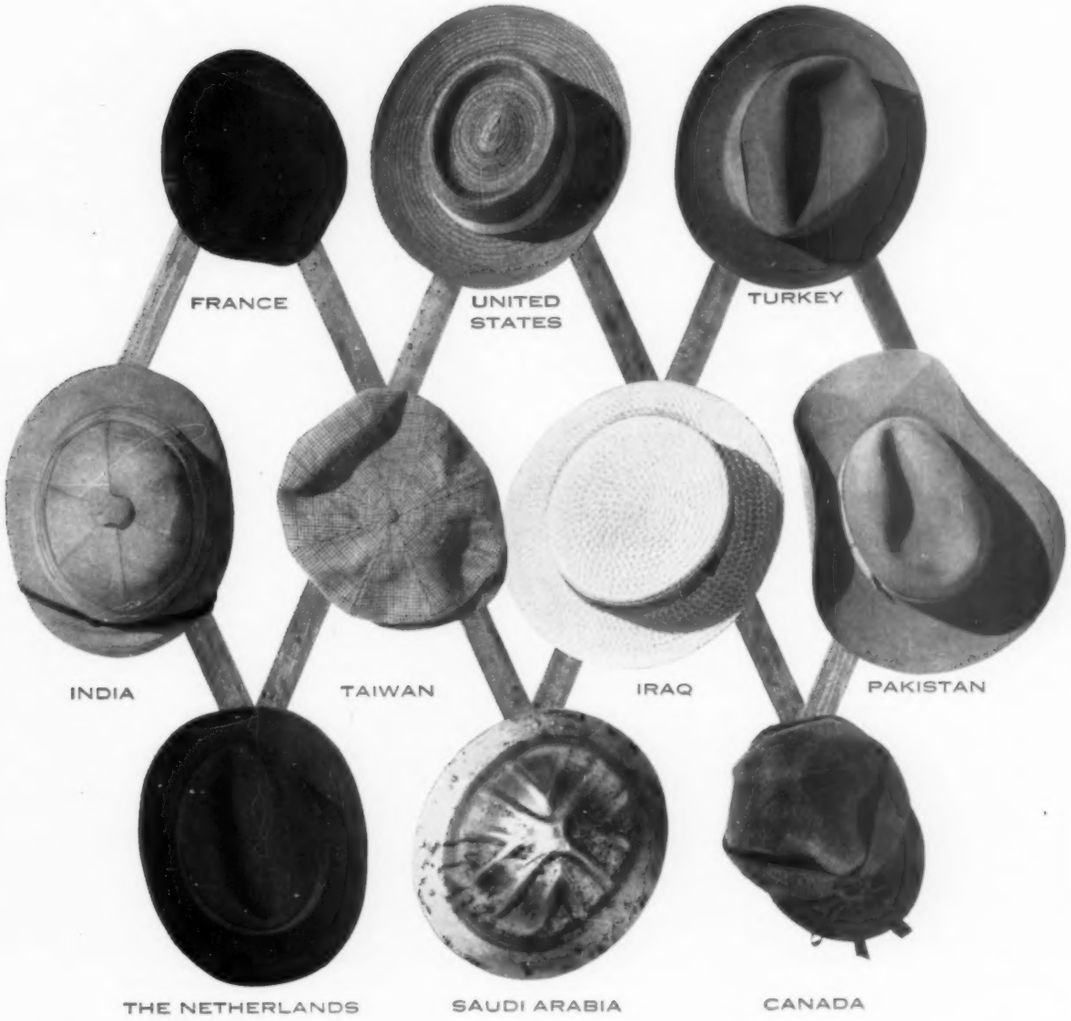
Discussions concerning a 65,000 b/d refinery recently were being held with the government. Owners would be Socony Mobil, 37%; Caltex, 34%; Shell, 18%; and British Petroleum, 11%. Location will be on the Gulf of Izmit, near Istanbul. Completion will be in about two years.

Transportation

Construction of a 450-mile products line of 4-in., 6-in., and 8-in. diameter, began during



TURKEY
WORLD PETROLEUM REPORT CONCESSION MAP
(DATA AS OF OCT. 11, 1957)



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September 1955. It will run from Iskenderun northeast to Batman for supply to NATO air bases. Two products lines for NATO are being laid by Cia. Technica Internazionale of Milan. One 4-in. line will run 205 miles from Bandirma on the Sea of Marmora to Eskisehir in central Turkey. An 8-in. line will run 250 miles from Antalya to Eskisehir.

During August 1956 a 14-mile pipeline from Raman field to the new Batman refinery was completed. A second line of 15.5 miles to Garzan fields was nearing completion in September.

Marketing

Marketing is the only aspect of petroleum operations which has been free of government control over past years. There are no exports and, aside from the very small amount of domestic production, Turkish needs are filled entirely by imports, primarily from Saudi Arabia, plus an agreement with Iran for delivery of 700,000 bbl yearly from the Kermanshah refinery.

Imports of petroleum products to Turkey came to 415,479 metric tons (8,310 b/d) in the first half of 1956, compared with 417,346 tons in the first half of 1955.

Imports are a heavy drain on Turkish foreign exchange, comprising 7.2% of total import costs during 1952 and estimated to have risen 40% to $40.5 million during 1954.

Total domestic demand for major products during 1954 was 7,780,000 bbl, or 21,315 b/d. Of this amount, 2,980,000 bbl were gasoline, 2,310,000 bbl distillate fuel oil, 1,770,000 kerosine, 370,000 lubricating oils, and 350,000 residual fuel oil.

Turkey's consumption has risen from 882,000 bbl in 1929 to levels previously indicated. The rise was very slow until 1946, and sharper thereafter. Estimated 1955 domestic consumption was 24,364 b/d.

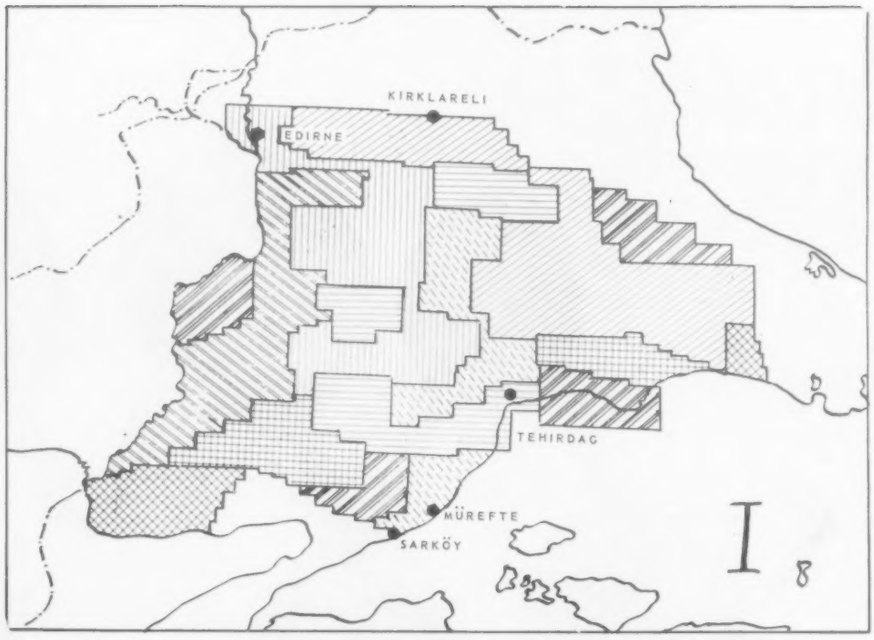
The price of regular-grade gasoline in Turkey, as of January 1, 1954, was $0.622 per gallon at retail levels, including duty and taxes. Prices are closely controlled by the government, and a basic price formula has been set up which closely defines the basic import cost components as port dues, duty, 15% municipal tax, consumption tax, warehouse tax, 18% transaction tax, highway tax, official allowance for leakage and overhead, and official profit allowance. As of June 1, 1952, these added nearly 5 times the original f.o.b. price of 99.47 lira per metric ton to gasoline, giving a final price of 497.50 lira, of which only 20 lira was official profit.

OIL LAWS

There are no constitutional provisions governing petroleum in Turkey, as are so frequently found in other nations. The controlling legislation is Petroleum Law 6326, as passed March 7, 1954, and published March 16, 1954, and the Regulations of March 1955. This law supplants previous legislation, which began with the Mining Code of 1906 patterned after French legislation, and was later supplemented by the Petroleum Law of 1926. All provisions of previous laws are abrogated by the present law, which governs all petroleum activities except marketing and distribution.

Activities are divided under the law into three stages of permit, license (hereafter referred to as exploration concession), and lease (hereafter referred to as development concession). The entire country is divided into nine petroleum districts, of which districts three and four have been declared partly closed.

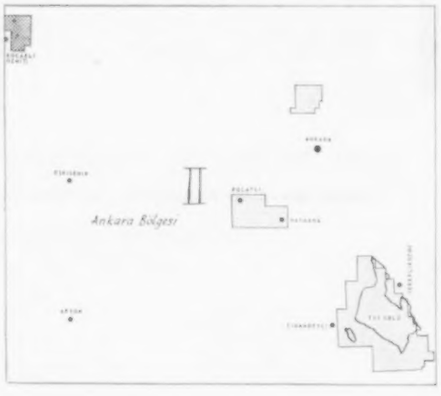
Press reports of changes in the Turkish oil law affecting concession size have been denied by authorities. There are, however, changes in substance contemplated in the law which were to have been in effect by December 1956. Their content has not been revealed.



The law is administered by a Minister of Industrial Development through the Petroleum Administration, headed by a Petroleum Administrator. The government, among other things, has the power to select applicants by virtue of their technical and financial ability, experience, furtherance of the national interest, and compliance with laws. These standards are to be used in determining the recipient of the lands now under application, especially those which overlap. Should other factors be equal, priority of application will prevail. Among applicants which are barred are those wherein a foreign government has an interest, although either foreign or domestic companies may hold petroleum rights.

Under the law, special permits for geological reconnaissance may be given of a nonexclusive nature on terms left to the discretion of the administrator.

EXPLORATION: The exploration license (or concession) gives the right to explore the licensed area and geologically related areas. The maximum area per exploration concession is 50,000 hectares (125,000 acres) per concession, with a maximum of 8 concessions per person or corporation in one district, making a total possible exploration area of 400,000 hectares (1,000,000 acres) per district. The regulations were published September 13, 1955, and license applications for exploration were made 30 days thereafter, or about October 13.



The concession duration is six years, with a right to two extensions of two years each, at the administrator's discretion, if no discovery is made within five years. The explorer is obligated to begin drilling not later than the third year of his oldest license and continue with not more than six months' lapse. Drilling on one license satisfies the drilling obligation on all licenses held in the same district. The license may be surrendered in whole or in part on one month's notice.

On discovery, the exploration concessionaire is guaranteed the right to convert his concession to a development concession covering one-half the same area. If discovery is made, the exploration concession is extended five years to allow definition of the field; and the discovery may be produced, subject to the same obligations as a development concession.

Fiscal obligations of the exploration concession are comprised in an annual surface rental payable as follows: during the first and second years 0.5 lira per hectare ($0.07 per acre), during the third and fourth years 1.0 lira per hectare ($0.14 per acre), during the fifth and sixth years 1.5 lira per hectare ($0.21 per acre), during the seventh and eighth years 2.0 lira per hectare ($0.28 per acre), during the ninth year 2.5 lira per hectare ($0.35 per acre), and during the tenth and any following years 3.0 lira ($0.42 per acre). Exploration expenses may be deducted from the amount of the surface tax up to 80% of the total tax and, in the event of discovery, the rental is credited against royalty payable on production. In addition to the tax, a guaranty must be posed for performance—amount to be specified by the government.

EXPLOITATION: The development concession, referred to in the law as a lease, conveys the right to drill, develop, and produce. The maximum area per development concession is 25,000 hectares (62,500 acres), with a total acreage per person or company in one district of 150,000 hectares (375,000 acres). There is express provision against creation of subsidiaries or other

TURKEY: Turkish helper examines beard of American welder who has been in Turkey for 12 months.

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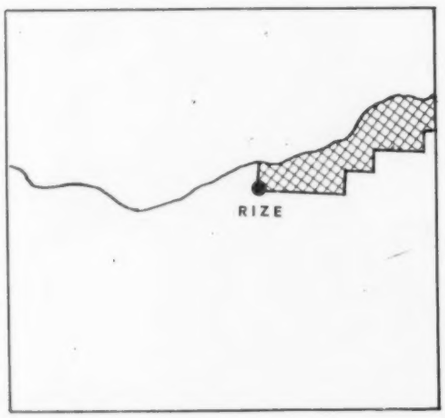
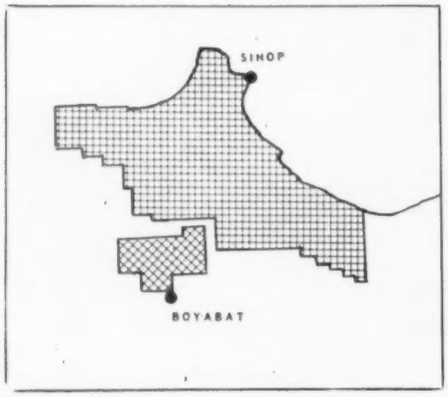
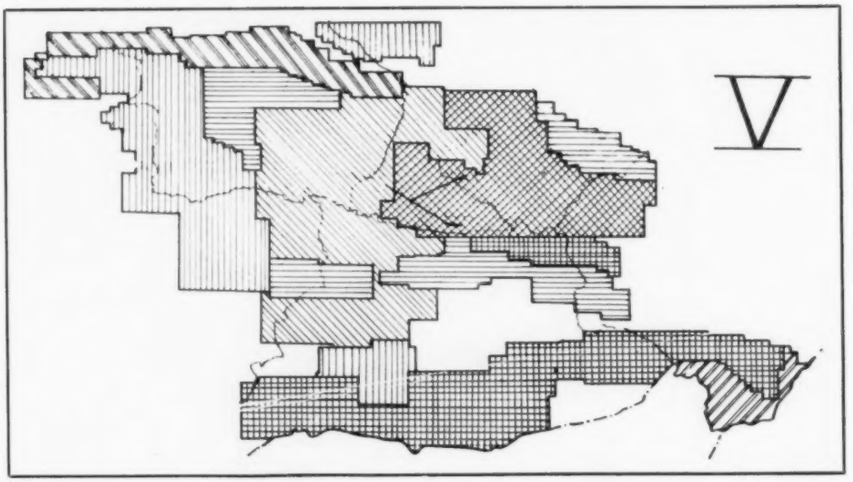


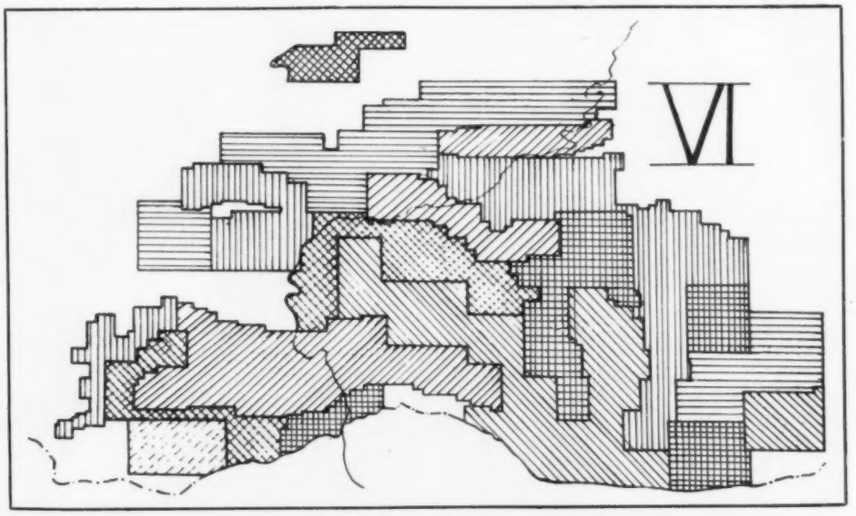
means to increase the maximum acreage held in either the exploration or development concessions.

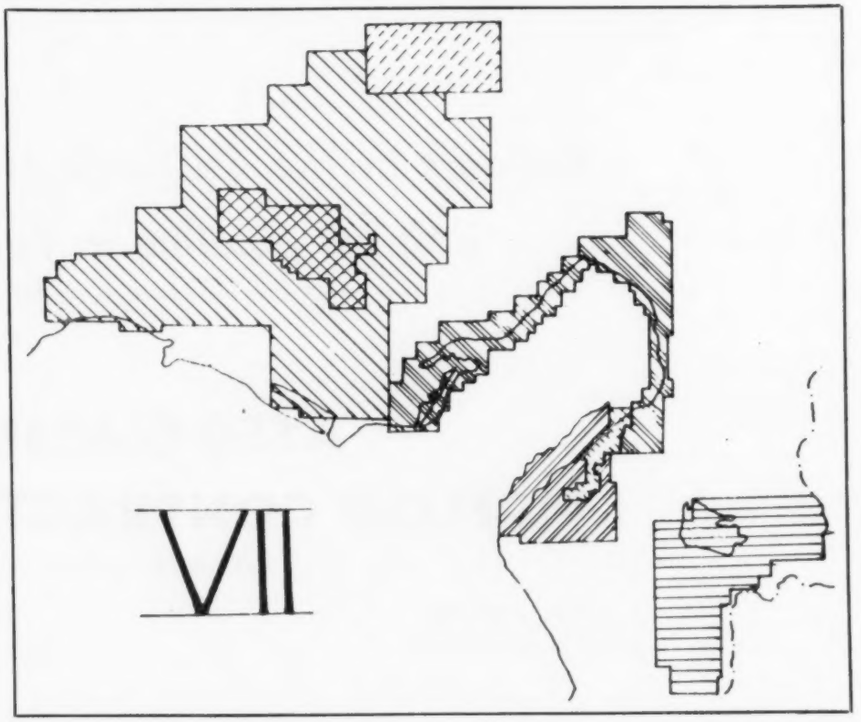
Any areas not covered by petroleum rights may be declared open to competitive bidding by the government, without obligation to give the area to the highest bidder.

The term of the development concession is 40 years, of which the 5-year extension of the exploration concession is part, and it is renewable for 20 years more on governmental decision and on "reasonable" terms as specified by









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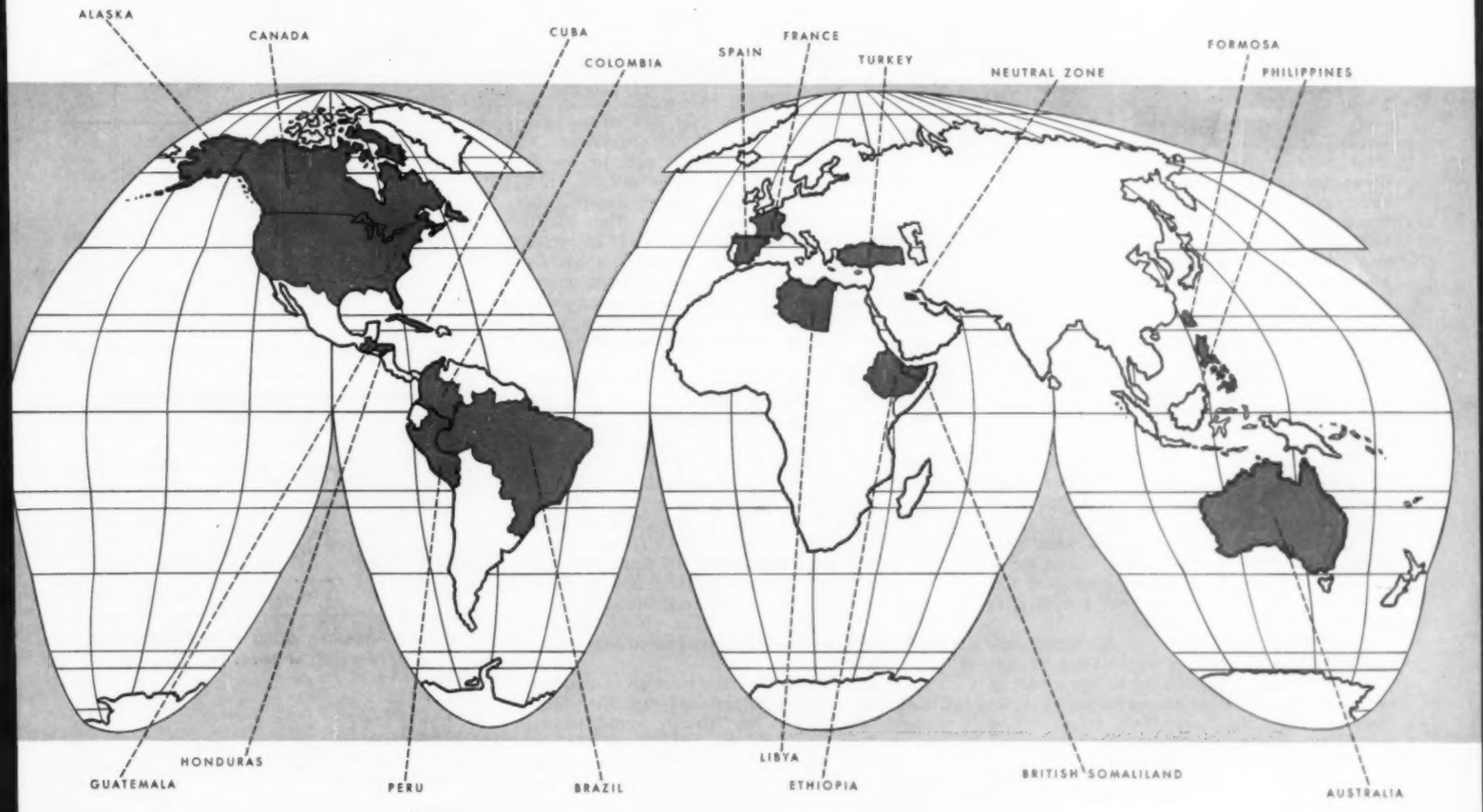


the Petroleum Administration. If the concession area is not already developed, drilling must begin within six months. Commercial production must begin within three years, or the lease may be cancelled by the government on 90 days' notice. The concession may be surrendered in whole or in part at any time by the concessionaire, on three months' notice.

Producers may be required to sell at market price all petroleum needed for local consumption within Turkey—amount to be determined by the government, including ships' fuel (bunkers) and aviation needs. If a refiner, he must also refine the quantity supplied. The government may require production to the levels needed for Turkish consumption, short of exceeding maximum efficient producing rate, or past that proportion required of other producers.

Fiscal obligations of the development concession include an annual surface tax, or rental, of 3 lira per hectare ($0.42 per acre) during the first year, 4 lira per hectare ($0.56 per acre) during the second, 5 lira per hectare ($0.70 per acre) during the third year, 6 lira per hectare ($0.84 per acre) during the fourth, and 8 lira per hectare ($1.12 per acre) during the fifth and following years. The amounts paid as rental are creditable against royalty paid during the same period; and, if concessionaire is producing without yet having converted his concession, he is subject only to surface rentals given for exploration concessions.

There is a royalty payable of 12½% of petroleum produced, excluding field use or amounts returned to formation. It is payable in cash at average market price or in kind. If in kind, the producer may not be required to store liquid petroleum for more than 30 days or to store any natural gas.

Producers are exempt for 15 years following March 1954 from payment of import duties on materials and machinery used, and from export tax on petroleum exported. In addition, there are given substantial deductions before payment of tax, including cost of goods purchased, amortization allowance, depletion allowance, losses due to damage and destruction not covered by insurance, rentals and royalties, exploration expenses (including intangible drilling costs and overhead), interest on indebtedness, wages and similar payments, unrecovered residual value of properties surrendered or abandoned, payments to others for property use, and deductions under other laws (not including those under Law 5421, Art. 7, Sub Art. 1, and Law 5422, Art. 1, Sub Art. 1). Losses sustained may be carried forward for 10 years. The most important of these deductions is the depletion allowance. On a percentage basis, it amounts to 50% of net income or 27½% of gross, whichever is higher. If taken on a cost basis, the depletion unit is calculated by dividing the value subject to depletion by the number of barrels of reserve. When multiplied by net production during the tax year, the result is the depletion allowance.

The development concessionaire is subject to all normal taxes following deductions listed above. Following recovery by the concessionaire of his investment, a surtax is added which brings total taxation to 50% of net income after payment for normal tax and other direct taxes, rentals, and royalties have been subtracted. The result is a 50-50 division of net profits after investment has been recovered.

Any capital imported by the petroleum concessionaire, either during exploration or development, may be repatriated to its country of origin at the exchange rate prevailing at the time of entry. By "capital" is meant actual money brought in, machinery and equipment, intangible rights such as patents, etc., and reinvested profits. Profits may also be repatriated on application.

NATIONAL FACTORS

Turkey has remained politically stable since the National Pact of 1919 which heralded the arrival of Ataturk, founder of the Turkish Republic. In 1946 the single-party system which he began was dissolved when Celal Bayar and other leaders left the Republican Party to form the new Democratic Party which is now in power, having been reinstalled by a landslide election in May 1954, over the other 12 political parties. The attitude of the government toward private capital, both foreign and domestic, has changed from the primarily State economy envisaged by Ataturk to a policy of actively encouraging foreign investment in essential fields, although there remains a fear of foreign exploitation. One positive manifestation of the new policy of investment encouragement is seen in the tax and exchange privileges listed hereinafter.

One obstacle to investment lies in the physical character of the country. The total area is 296,500 square miles, slightly larger than Texas. Internal topography is rough, and transportation means are inadequate—although the highway network has strongly improved since a 9-year plan was instigated with USA aid in 1949. The rail network has expanded somewhat, but less rapidly due to high costs. The population of about 23 million (by 1955 census) is engaged primarily in agriculture, which in 1951 contributed 58.1% of national income; and skilled labor is scarce.

The labor movement in Turkey is very young, undeveloped, and peaceful. Labor legislation is largely summarized in the 1936 Labor Code which provides, among other things, a 48-hour week of 8 to 9 hours daily (which is largely ignored; 10 to 11 hours are often the rule), and no minimum wage. Although employment of foreigners is limited, this is set aside by provision of the special law for new investments. Disability incurred on the job must be compensated up to 52 weeks at 75% salary for persons or dependents with temporary disability, or 60% pension for permanent disability. Medical care and sickness insurance must be paid by the employer. The total cost of labor legislation to the employer is only 12% of the base wage.

Unions cover only a small part of the 8-million-person labor force (of which only 12% is employed in industry and mining). The largest labor confederation is the TCTU (Turkish Confederation of Labor), of which the petroleum union, the Raman-Batman Oil Workers Syndicate, is a member. Since unions do not have the right to strike, the labor scene remains peaceful, aided by high employment, although there is serious under-employment in agriculture.

Average wages are low; and, although there is little skilled labor available, there is little difference in skilled and nonskilled wage rates. Monthly wages during 1952 ranged from 225 lira ($78) to 1,000 lira ($350) for supervisory personnel; 175 to 750 lira monthly for skilled workers ($62 to $265); and from 110 to 500 lira ($39 to $177) monthly for unskilled workers. These rates are less than half USA union scale. In the mining industry, during April 1955, the average miner received 4.5 to 5 lira daily, or about $1.60 to $1.79, with additional "fringe" benefits totaling about 2.5 lira ($0.89) per day in the form of hospitalization, free meals, dormitory, etc.

Substantial benefits have been given new industries as regards foreign exchange. The official unit of currency is the Turkish pound, known as the lira, divisible into 100 kurus. At the official rate, the lira is worth $0.354, and at the unofficial rate (as of March 30, 1955) $0.12. The official rate has been used in conversions given earlier in this report, since this is the rate which entering petroleum companies must use. Ordinarily companies are given the right to export 10% of their invested capital yearly and profits up to 10% of their invested capital. By the new Foreign Investment Encouragement Law of January 18, 1954, however, there is no limitation on the repatriation of capital or profits for new approved investments. The rate used is that prevailing for the foreign currency involved (for example, the dollar) at the time of transfer, or the official rate in the case of capital.

Taxation on corporations, including all "limited by shares," is a flat 10% of net profits, with State-owned enterprises, as well as those owned by associations or trust funds, subject to a flat 35%. The tax is payable on net profits, with deductions authorized for losses incurred in past two years. There is no capital, dividend, remittance nor general sales tax; nor does a tax treaty for the avoidance of double taxation exist with the United States.

The Turkish economy has been strained by the increase in economic development and in military expenditure, and the government has been forced to restrict foreign trade severely. Payments on oil imports are considerably in arrears, and now subject to negotiation with the government. END

TABLE I—TURKISH PETROLEUM STATISTICS
(Thousands of Barrels)

Year	Production	Imports (Products)	Crude Runs to Stills	Consumption
1929	—	882	—	882
1934	—	1,116	—	1,116
1938	—	1,261	—	1,261
1944	—	1,249	—	1,249
1945	—	1,139	—	1,139
1946	—	1,455	—	1,455
1947	—	2,027	—	2,027
1948	—	3,498	—	3,498
1949	94	3,690	52	3,742
1950	108	3,882	52	3,934
1951	129	NA	80	5,103
1952	146	NA	85	6,370
1953	179	NA	79	7,162
1954	399	7,371	85	7,780
1955	1,277	7,725	73	7,798e
	(3,500 b/d)	(21,164 b/d)	(200 b/d)	(21,364 b/d)

e—Estimated. NA—Not available.

TABLE II
TURKISH OIL IMPORTS
(1st Half 1956)
(Metric Tons)

Gasoline	108,096
Kerosine	115,051
Fuel oil	161,104
Diesel oil	12,326
Lube oil	18,902
Total	415,479

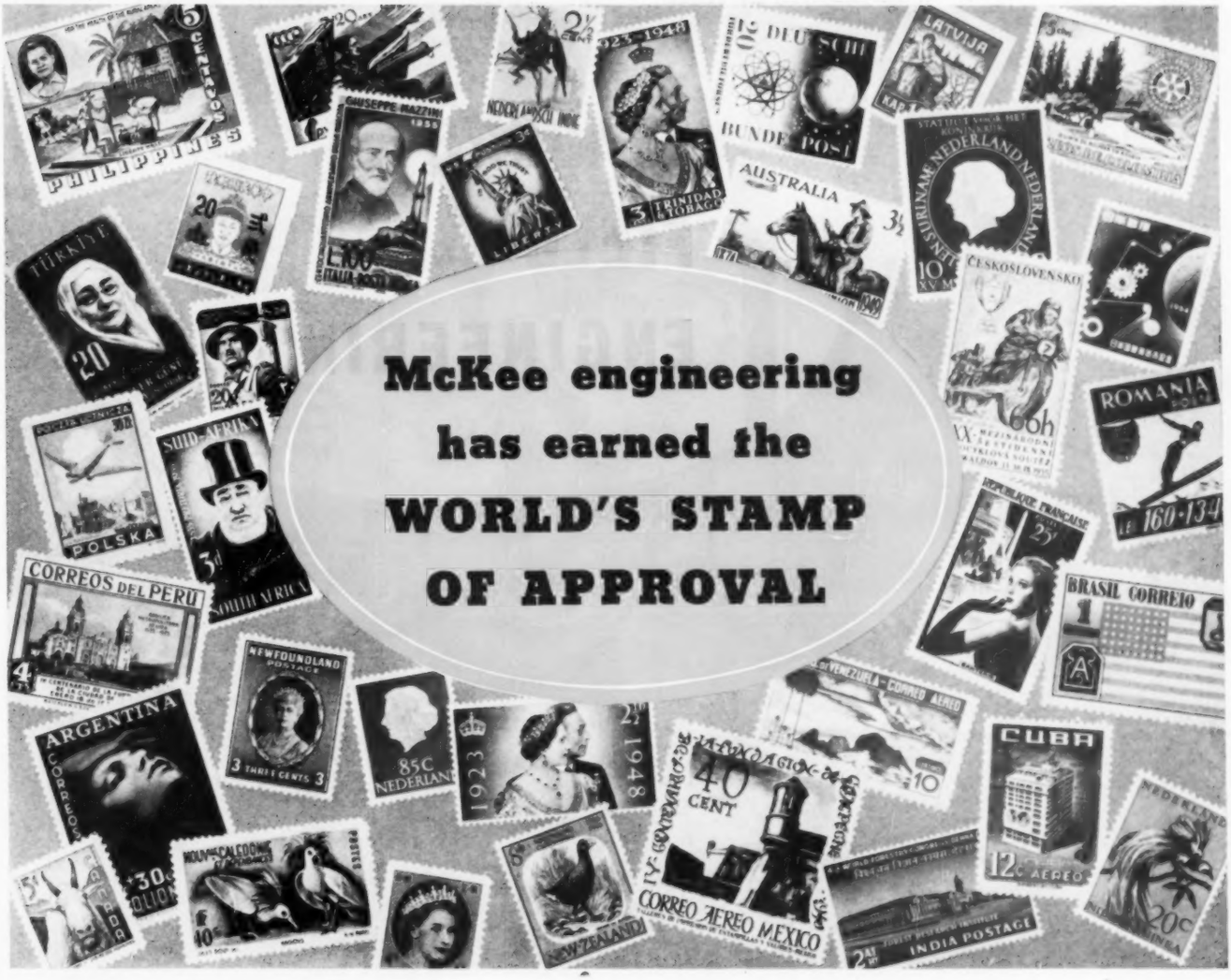
TABLE III
TURKISH REFINERY PRODUCTION (BATMAN)
1st Half 1956
(Metric Tons)

	Gasoline	Diesel Oil	Fuel Oil	Asphalt	Total
January	2,283	1,024	11,083	1,335	15,725
February	3,346	774	11,226	1,339	16,685
March	4,025	166	11,364	2,973	18,528
April	2,806	882	4,607	2,234	10,529
May	4,995	197	13,456	3,216	21,864
June	4,194	155	10,321	3,007	17,677
Total	21,649	3,198	62,057	14,104	101,008

TABLE IV—TURKISH CRUDE PRODUCTION—1956
(Thousands of Barrels Per Day)

January	5.9*	July	5.1
February	5.9*	August	5.3
March	5.9*	September	4.5
April	5.9*	October	7.1
May	6.0	November	7.2*
June	4.5	December	7.1*
		Year	5.9*

*Estimate.



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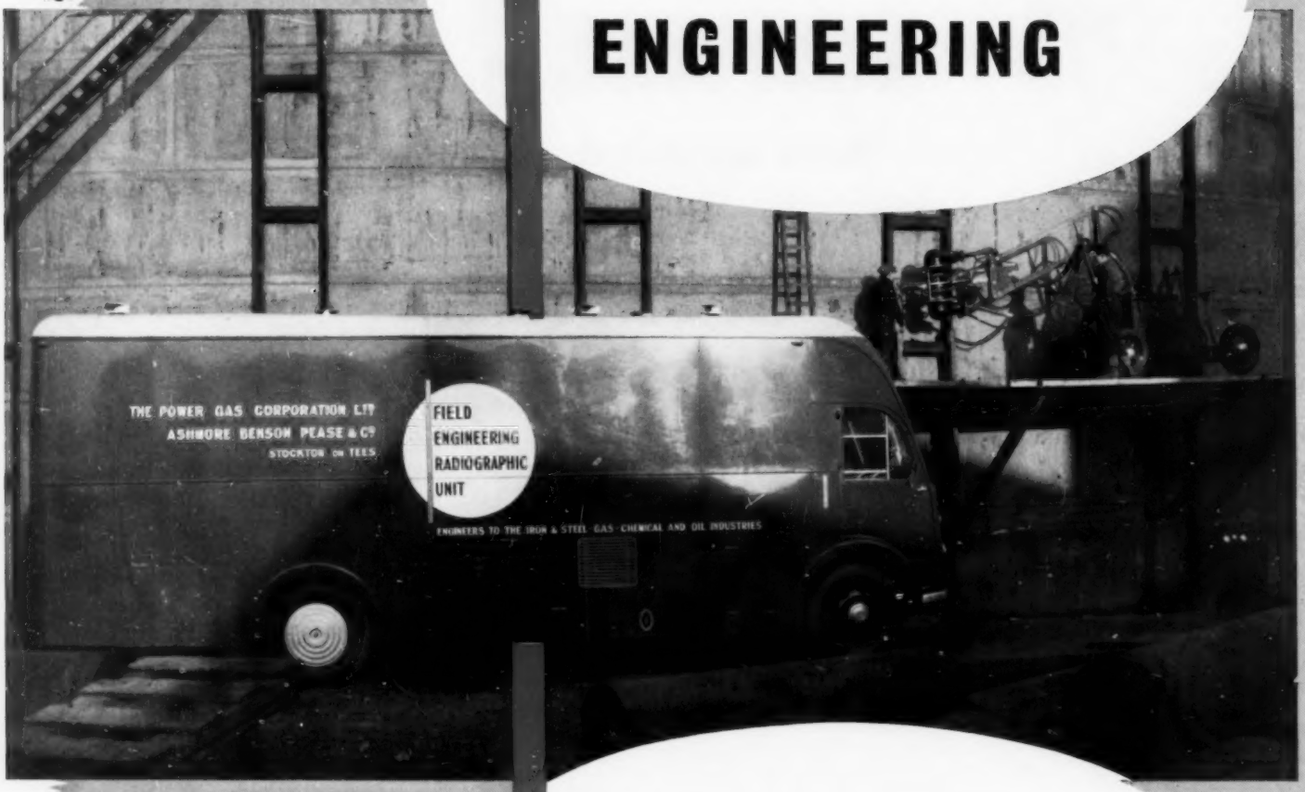

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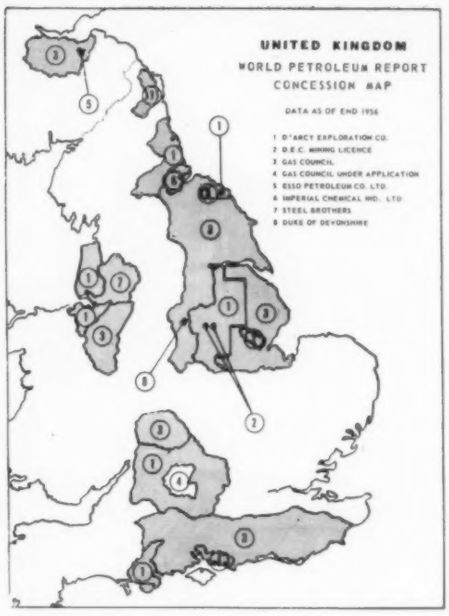


Exploration

The search for oil in the United Kingdom began on a large scale with the passage of legislation in 1934 vesting subsoil rights in the government and enabling large holdings by exploring companies. Previous to that time there had been tar springs known as far back as Roman times, and some small production had been obtained following World War I—when, on advice of American consultants, drilling was carried out at Hardstoft, Derbyshire. There, one well produced about 1,236 tons to 1945 (when production ceased), and one well in Scotland produced small quantities of oil and gas.

At present D'Arcy Exploration Co. Ltd. (owned by British Petroleum Co.), Anglo-American Oil Co., Gulf Exploration Co., and Steel Bros. are exploring.

D'Arcy has discovered two small fields, and Steel Bros. is still looking. Other companies are not active at present.

The first deep well was drilled in at Portsdown Hill, near Portsmouth, to test Cretaceous and Jurassic possibilities. It was abandoned, as dry, at 6,556 ft after some slight shows of oil had been obtained in the Upper Jurassic. A second well at Nenfield, Sussex, was finished at 5,105 ft in the Carboniferous, with only slight shows of oil and gas. A third well at Newbury went down to 5,125 ft, with similar negative results.

A well at Eakdale in Yorkshire went to 5,040 ft, with good methane-gas shows. In 1937 the Consland anticline near Dalkeith, southeast of Edinburgh, proved small amounts of oil. British Petroleum Co. has done extensive geological and geophysical work in Carboniferous rocks and structures in the Midlands, where the Nardstoft well was drilled in 1917-18.

Production

Drilling in the Formby area in West Lancashire, with a Failing rig, in peat and glacial drift to the Trias at about 100 ft brought in 53 shallow holes, 8 of which are still producing about 10 tons per month (2 b/d). Cumulative production in the field through 1955 is 9,222 tons (about 64,500 bbl). The oil is similar in gravity with that from the Eakring field, and evidently is being derived from a deeper source in the Carboniferous—although a deep test to 7,680 ft gave no shows. BP now is drilling a deep test well at Upholland, Lanos, east of Formby; and Steel Bros. recently drilled a test well at Cronteth near Liverpool, southeast of Formby, to more than 4,000 ft—with small shows of oil—and is drilling another at present.

The principal producing field is at Eakring, Nottinghamshire. A well in 1939 found oil in the sands of the basal Coal Measures and in the Millstone Grit series—about 60 ft thick in the top—in Rough Rock; about 25 ft thick in the Longshaw, and, in the Chatasworth Grit, 250 ft thick but productive only in the upper part. A lower grit, the Kinderscont, also has oil. A deep test penetrated Carboniferous massive limestone from 2,555 ft to 4,180 ft; from 4,180 ft to 7,200 ft red conglomerates and sandstones alternated; and at 7,463 ft to 7,468 ft the well finished in gray quartzite and hard black shale.

Several producing fields are in the area, including Eakring, Duke's Wood, Caunton, Kelham Hills, Egmanton, and Plungar—the latter two located in 1955 and 1953, respectively. Peak production in these fields occurred in 1943, when 111,607 tons of crude (about 2,230 b/d) were produced. Water flooding was begun in 1948 at Eakring; in 1949 at Duke's Wood; Kelham Hills in 1951; and at Caunton in 1954. Production increased immediately, and in 1955 averaged about 1,000 b/d, for a total of 49,910 tons. However, the fields are still declining rapidly.

Shooting has been used to increase the productive capacity of wells, especially water injection. Wax deposits begin in the wells at above 1,200 ft, and have been overcome by cleaning with steel plungers and electric heating.

Further work in this area has been done by British Exploration Co. Ltd., for the Gas Council. Four rigs are in use. Some shows of oil and gas have been found, but no commercial production.

Refining

The original refinery in the United Kingdom was the Midlothian, Scotland, plant of James Young and Co. for distillation of oil from cannel coal. The first large-scale plant was the 10,500 b/d Llandarcy refinery of National Oil Refineries Ltd., a subsidiary of British Petroleum Co. Construction began in 1919, and the operations were directed by E. Lawson Lomax, now London editor for *World Petroleum*.

Other early refineries included a plant for Duo-Sol refining of lubricants, by Herbert Green, and a Hull refinery, by the Major organization—both now dismantled. A refinery with a cracking plant, built by Agwi at Fawley in 1921, is now dismantled. A fully integrated refinery at Ellesmere Port by Lobitos Oil Co., to process Peruvian crude, still is in operation; and a 1938 plant by Manchester Oil Refinery Ltd. also is still operating.

Following World War II the government reversed its policy, and in August 1946 removed a tax (imposed in 1933) of one shilling per gallon on heavy oils. Together with the lack of development in the coal industry, this served as an incentive to the oil companies and, by mid-1956, there was a total of 597,000 b/d design capacity in the country. Extensions planned will bring this to about 840,000 b/d in 1958.

Marketing

Consumption of oil has risen very rapidly. Total rise from 1950 through 1955 amounted to 52%. This includes refinery consumption; if this is excluded, the rise amounts to 45%.

The sharpest rise was in propane and butane use which, over the period, rose by 110%. The second highest was fuel oil, which rose 74%, while all black oils rose by 60%. Gasoline advanced only about 20% during the period, and kerosine only 10%.

During the period under review, direct imports from the Middle East have more than doubled—reaching 62% of UK imports during 1955. This excludes some refined products imported from Europe; so the dependence on Middle Eastern crude is even higher. The imports are principally from Kuwait, followed by Iran and Iraq. The recent closing of the Suez Canal severely curtailed consumption levels, and rationing was introduced, December 15.

The increase in the use of fuel oils is estimated to continue during the next 5 years. A spokesman for the British Fuel and Power Industry estimated in 1956 that fuel-oil demand will increase an average of 23% yearly over the next 5 years, to about 420,000 b/d in 1960. This rate is considerably above the estimated increase in oil use generally, which is estimated to rise from about 18.75 million tons in 1955 to 34.5 million tons (about 690,000 b/d) in 1960.

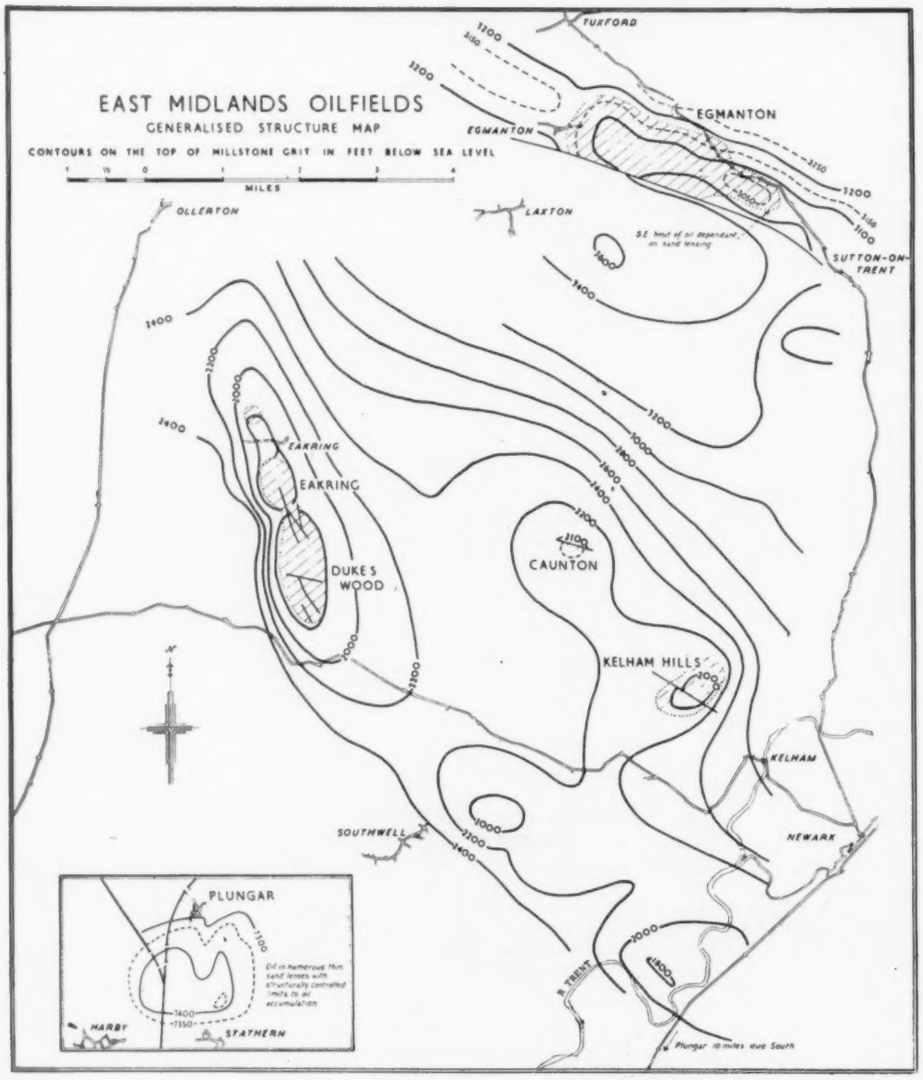
OIL LAWS

Exploration and production in the United Kingdom are governed by the Petroleum (Production) Act, 1934; the Petroleum (Production) Regulations 1935; and the Petroleum (Production) Amendment Regulations, 1954. The Mines (Working Facilities and Support) Act, 1923, and the Gas Act, 1948, also apply.

The laws vest ownership of the subsoil in the government. The regulatory agency is the Ministry of Fuel and Power, to which all applications for oil rights must be made. The legislation does not extend to Northern Ireland.

With the regulations are "model clauses," which form part thereof. The content of the "model clauses" is included with that of the applicable laws in the following summary:

Rights can be held only by British subjects or companies incorporated in Great Britain or Northern Ireland. At least one director must be



British, and the majority of employees must be British.

Oil rights are grantable only to persons or companies from countries which grant equal rights to British nationals or companies. USA companies and citizens are considered eligible for such rights, and these grant reciprocal rights.

EXPLORATION: The exploration right is known as a prospecting license. Maximum area is 200 square miles; minimum is 8 square miles. One person or company may hold "several" licenses. Duration of the license is three years, with a possible extention of two one-year periods. Licenses may be assigned only to persons similarly qualified, and with the consent of the government.

A bond of six pounds per square mile of license area must be posted. There is also an application fee of 20 pounds per license, and a minimum annual payment. The latter is 5 shillings per square mile of license area during the first through third years; 10 shillings during the fourth through the tenth years; and 15 shillings thereafter.

Applications for prospecting licenses must contain the applicant's full name; complete information on ownership and structure, if application is by a company; a brief description of the area required, and of previous experience in oil development or prospection. The amount of capital to be employed is also to be specified.

EXPLOITATION: The same provisions regarding assignment, ownership, and application apply to development rights, which are known as mining licenses. The maximum size of each license is 100 square miles, with a minimum of 4 square miles. "Several" licenses may be held by one person or company, and the reciprocity provisions prevail.

There is no limitation on the foreign capital which may participate, but stock issues require treasury permission. Such permission usually is obtainable if the proposal is not disadvantageous to the interest of the sterling area. Profits from such investments are freely transferrable, subject to UK taxation; and capital invested may be freely repatriated.

On both the prospecting and mining licenses, the licensee may apply for extension of the license to adjoining areas. Surrender of the prospecting license may be accomplished in 3 months; for mining licenses, 18 months' notice must be given—although parts of the license may be surrendered on only 6 months' notice.

Domestic cosumption of Great Britain and Northern Ireland must be supplied before export may take place.

Duration of the mining license is 50 years. The conversion of the prospecting license thereto is guaranteed. One extension of 25 years is possible for the mining license.

Royalty payable on production is not less than 3 shillings per ton of 2,240 pounds, and not more than 6 shillings per ton. On natural gasoline, the royalty is not less than one-eighth of a penny per Imperial gallon, and not more than two pennies per Imperial gallon. On receipt of the 25-year extension, royalty rates increase by 25%. Royalty rates may be reviewed every 10 years to adjust them to changed prices in Britain.

Minimum annual payment on mining licenses is 3 pence (pennies) per acre during the 1st year—rising to 9 shillings per acre in the 10th and subsequent years. The payment is deductible from royalties; if royalties are less than the minimum payment, the royalties are not paid.

A guarantee bond of 20 pounds per sq. mile (minimum 1,000 pounds) must be posted.

Although income taxation in the UK is a standard 42½%, plus 27½% profits tax (distributed) plus 2½% (undistributed profits), and petroleum operators are subject thereto, tax relief is given the oil industry in several ways. Capital expenditure on works such as roads, embankments, etc. (but not the cost of machinery or land) may be written off by an initial allowance of 40%. Dry-hole exploration costs may be written off as one sum.

In addition, on capital expenditures for machinery or plant, there is an allowance of 20%, plus a final balancing allowance if the plant is sold or scrapped. Buildings used for processing, such as an oil refinery, are given an initial allowance of 10%, plus an annual allowance of 2% and a balancing allowance on sale or scrapping.

The 1954 Finance Bill included a new type of allowance on investments made subsequent to April 6, 1954. Under the revised laws, tax allowances equal to 120% of expenditure may be received.

The tax on imported oils is higher than on oils produced from domestic coal, shale, or local oil wells. On imported oils, it is 2 shillings 6 pence per gallon; whereas on domestic oils it is only ⅛ pence per gallon. This has served to stimulate domestic production and exploration.

END

TABLE I

CRUDE-OIL ANALYSIS—EAKRING FIELD

	Rough Rock	Lower Sands
Specific gravity at 60 F	0.848	0.828
Distillation:		
Initial boiling point, C	51	37
Volume at:		
100 C	3.5	8.0
200 C	21.0	27.0
300 C	35.0	46.0
Sulfur, % by weight	0.18	0.07
Wax deposits, at F	85	80
Viscosity at:		
70 F	—	15.09
80 F	—	8.97
100 F	—	5.33
120 F	—	4.27

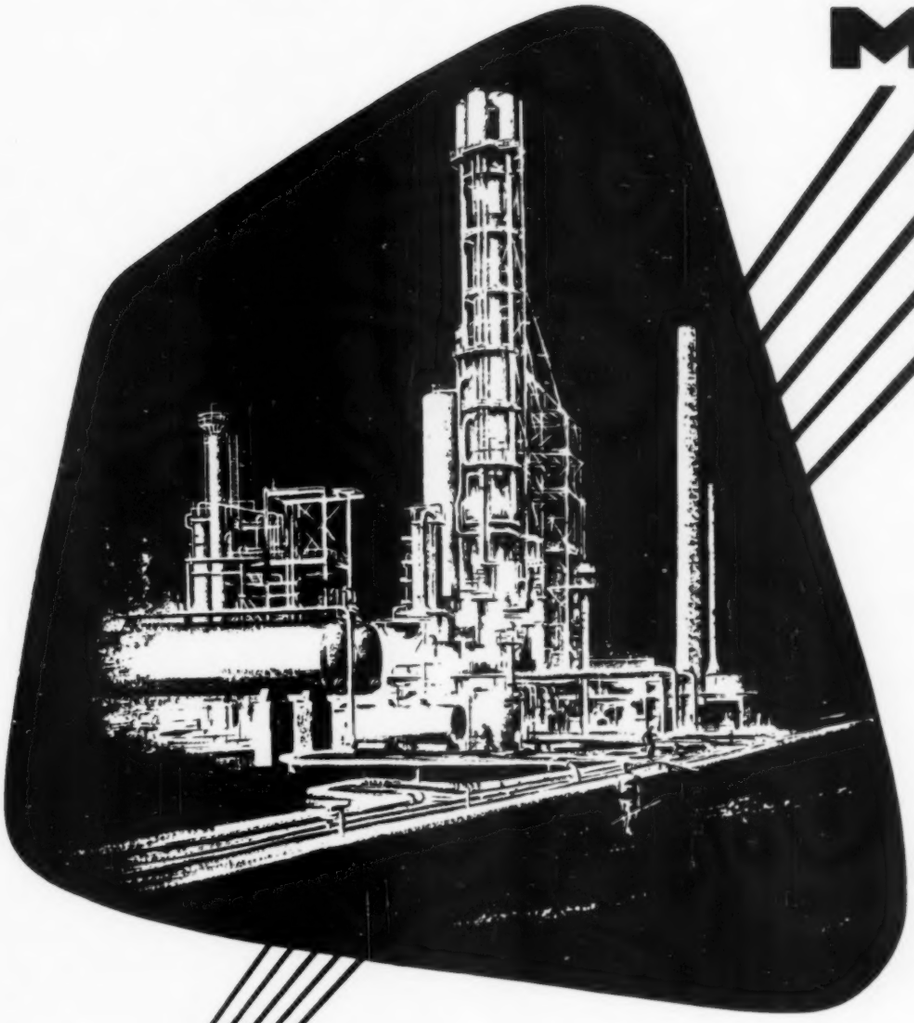
OIL CONSUMPTION (INLAND) IN THE UNITED KINGDOM

(Thousands of Long Tons)

Product	1955	1950	1954
Aviation fuels	1,698	NA	1,488
Motor gasoline (including benzol)	6,240	5,195	5,922
Industrial gasoline	134	81	121
White gasoline	149	149	148
Kerosine	1,381	1,539	1,311
Automotive gas oils	1,601	1,304	1,413
Gas and diesel oils	2,160	1,595	1,937
Fuel oil	5,384	3,093	4,416
Lube oils and greases	889	749	845
Paraffin wax and scale	46	43	46
Propane and butane	63	30	59
Asphalt	865	621	808
Others	567	498	607
Total	21,177	14,627	19,121
Refinery consumption	2,060	650	1,923

NA—Not available.

M·A·N



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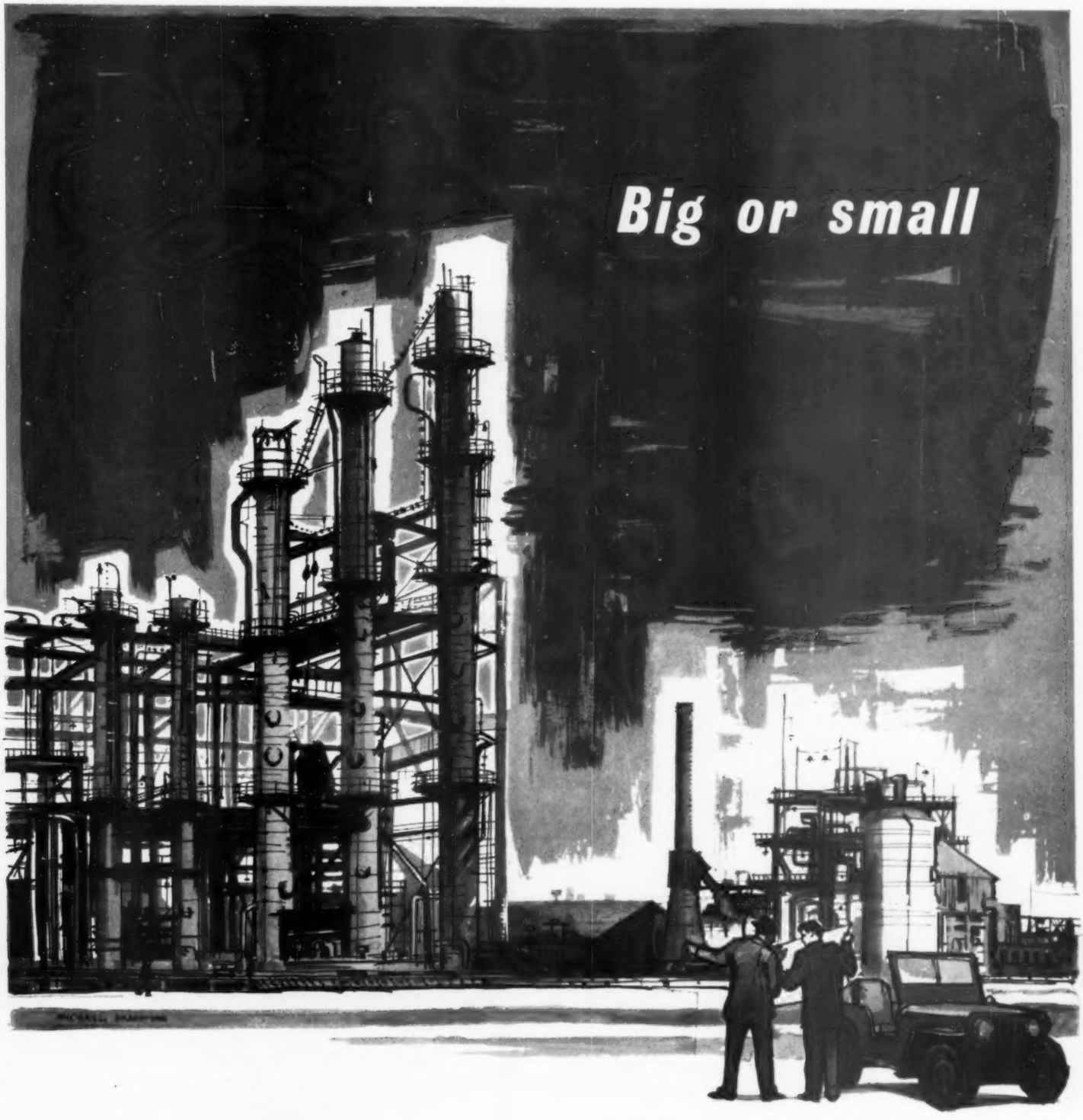

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contracts across the world

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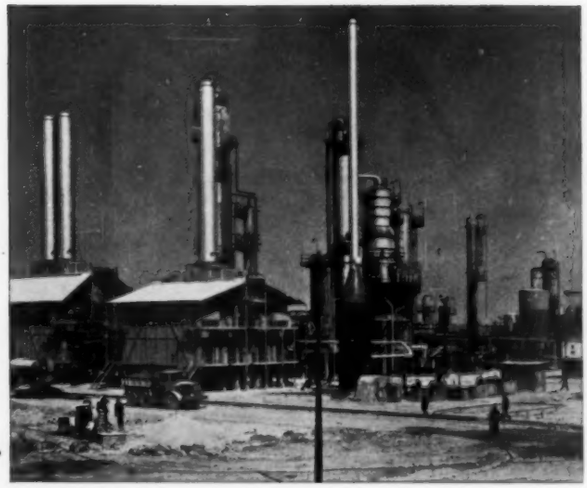

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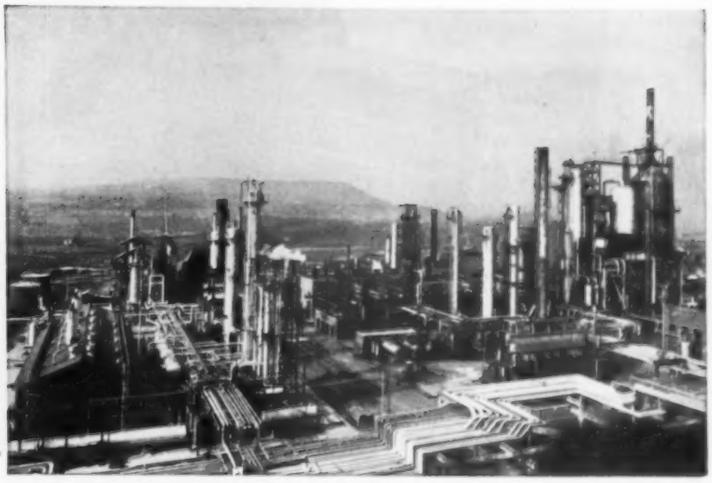

1. Kwinana

D. & C. and William Press Limited, in association with Costain-John Brown Limited and Kinnear Moodie & Co., Limited, formed the Kwinana Construction Group for the construction of the new British Petroleum Company refinery at Kwinana, near Fremantle, Western Australia. Photograph by courtesy of British Petroleum Co. Ltd.

2. Daura

Contract for the civil engineering work in the Daura Refinery, Baghdad—for heavy concrete foundations, roads, water storage and filtration tanks—was awarded to D. & C. and William Press Limited in 1952 against strong international competition. The refinery—for petrol, fuel oil and kerosene—was officially opened by King Feisal II in 1955.

3. Llandarcy

D. & C. and William Press Limited were the general contractors for civil engineering and mechanical erection in the extension to this vast South Wales refinery. Photograph by courtesy of British Petroleum Co. Ltd.

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VENEZUELA

Exploration

Although Venezuela began producing asphalt before the turn of the century, oil exploration and development are relatively new. The first major discovery was at Guanoco, in the eastern provinces, during 1913. The original discovery well in Lake Maracaibo, El Mene Grande, was drilled in 1917 by the Shell group. It was a small producer, and it was not until December 14, 1922 that the first major producer, R-4, came in with an initial production of 100,000 b/d. It began the rapid development of Venezuelan oil.

To date three major petroliferous basins have been discovered. The first found, and the most prolific to date, is the Maracaibo basin, the largest oil field in the Western Hemisphere. It is a geosynclinal basin of sedimentation, in the center of which is Lake Maracaibo. Production is from the Eocene, Cretaceous, and Miocene, and there are two main producing areas in the basin: the Bolivar coastal field along the northeast border of the lake, and the various fields in Maracaibo and Mara districts on the northwest. The second major basin is the Orinoco, in the northeast part of Venezuela. It is second in production and reserves to Maracaibo. Within the Orinoco basin there are three main trends: the Quiriquire-Jusepin-San Joaquin; the Tucupita-Temblador-Oficina; and the Las Mercedes-Tucupido. The third major basin is the Apure; it is here that the Barinas field was found in 1953 by Sinclair, the most recent major discovery in Venezuela.

From 1945 through 1955 no new exploration concessions were granted, but considerable exploration took place on acreage previously held. This acreage has been progressively reduced by action of the oil law which obliges concessionaires to surrender half their exploration acreage when it is converted to exploitation concession. As the terms drew to a close on exploration concessions, more and more were halved and converted to exploitation concessions. At the beginning of 1956, however, there were still some 14.6 million acres under concession—with 26 companies holding exploitation rights, of which 5, viz., Creole Petroleum Corp., Cia. Shell de Venezuela, Mene Grande Oil Co., Socony Mobil Oil Co., and Sinclair Oil and Refining Co., held the largest acreage, ranging from about 3 million to 1.9 million acres apiece, of which only a small part has been proved.

The major recent discoveries have been made by Sinclair Oil Co. In May 1953 this company discovered the Barinas field, now estimated at at least 66 million barrels of reserve, with its No. 1 Sinco well. The Barinas field is in the Apure basin, located far inland to the south and east of Lake Maracaibo. The only other discovery in the basin was by Socony Mobil Oil Co. in 1945, at San Silvestre, which is located north and west of the Sinclair discovery. The cost of a pipeline from this area is estimated at around $25 million, and the companies currently are planning a 240-mile line to the coast.

The outstanding discovery during 1956 also was by Sinclair's affiliate, Venezuelan Petroleum Co. This discovery was in eastern Venezuela, not far from Sinclair's Santa Barbara field in the Greater Oficina area of western Monagas province. The discovery well, Aguasay 3-1, produced 27,000 bbl in 25 days. Production is of 36 API crude, from Oficina sands of good porosity of Oligocene age. The "T" and "S" sands are producing at present. The "T" sand, 50 ft thick and producing 687 b/d, came in at 1,355 ft. The drillers came up about 100 ft, and perforated the "S" sand for around 600 b/d. There are at least six other sands indicated on the electric log which as yet have not been tested. Structure maps indicate about 900 acres (depending on geology) of productive area.

Aguasay 3-1 is located about 27 miles from the Santa Barbara-La Cruz 16-in. pipeline, owned one-third by Sinclair. An 8-in. connecting line is planned. Another wildcat, Aguasay 4, is drilling about 4 miles due west. Aguasay 1 and 3 are about 3 miles south. No. 1 was a producer at about 100 b/d; No. 3 has gone mostly to gas. An offset to the discovery, Aguasay 3-2, is drilling now.

The total exploratory effort in Venezuela, even without new concessions, has been most impressive. Wells completed in 1955 totaled 1,178, a 41% increase over 1954. However, 59.1% were development wells, while exploratory drilling (including wildcat and outpost wells) declined. Of the total 171 exploratory wells, some 76 were successful, but none resulted in major additions to Venezuelan reserves.

Other exploratory activity in 1955 was almost the same as in 1954. Exploration can be carried out freely by any interested party in areas not under concession. Some 412 party-months were spent during the year—of which 203 were seismograph, 152 were surface parties, 31 gravity, 6 stratigraphic tests, 18 structural drilling, and 2 air magnetometer.

A total of 1,005 oil and gas wells was drilled in Venezuela in the first 9 months of 1956. The Shell group, with 307, drilled the largest number; Mene Grande was next, with 259; and Creole Petroleum Co. third, with 116. A total of 12 companies drilled.

Oil development wells totaled 840; 45 were oil wildcat wells, while 7 others were gas wells. A total of 58 of the development wells were dry, and 55 of the wildcat wells were dry.

Major developments in exploration, however, began in earnest during 1956 with the long-awaited exploration concession grants. The basic reason for granting concessions was to maintain Venezuela's rank in the world petroleum picture. As the second largest producer in the world, following the United States, Venezuela still had large areas relatively unexplored. Proved reserves, however, were falling behind as production mounted. At the beginning of the year, proved reserves were equal to 14 years' supply—a margin which was approaching the danger point, since there is always a time lag between beginning new exploration and discovery. In his announcement of new concessions, the president of Venezuela, General Perez Jimenez, based them on several reasons which later were set forth by Dr. Edmundo Luongo Cabello, Minister of Mines and Hydrocarbons. These reasons were:

1. *Increase of oil reserves:* Proved oil reserves have been maintained in the neighborhood of 10 billion barrels, sufficient at the present rate of production, and with no major exploration being carried out, for less than 14 years, behind other producing countries which have increased their reserves by increased exploratory activities.

2. *Increase in the ratio between acreage under lease and barrels of oil produced:* In Venezuela, for each barrel of oil produced, there are 3½ hectares (8.6 acres) under lease; whereas in Canada there are 95 hectares (234.7 acres), in the Middle East 63 hectares (155.7 acres), and in the United States 19 hectares (47 acres).

3. *Diversification of the oil industry in its broadest sense:* Diversification, within the oil industry itself, has two purposes: (a) the encouragement of new capital and, (b), insofar as possible, the strengthening of its weak points by balancing the production of heavy crudes with that of light crudes (at present the proportion is 70% heavy and 30% light), and by a better distribution of production within the various oil basins of the country. This distribution may be achieved by:

i) Intense exploration of zones where proved reserves have not yet been classified as commercial (Barinas, for example).

ii) Extending exploration to the areas adjacent to those where production is persistently declining (Monagas).

iii) Exploratory activities in new zones (Apure).

The minister pointed out that, during the period 1943-54, the revenues of the government from the oil industry amounted to 12.3 billion bolivars, whereas the net profit of the industry totaled 9.7 billion bolivars. The split of profits, in accordance with the 50-50 principle, in fact has been 56% for the government and 44% for the oil industry; and of this 44%, the oil companies have reinvested 38% in the country. He emphasized, however, that Venezuela does not want to break through the 50-50 pattern which has been accepted all over the world. On the contrary, the Venezuelan government reaffirmed

TABLE I

DRILLING IN VENEZUELA—1954-1956

	1954		1955	
Type	No.	%	No.	%
Wildcat	178	21.2	165	14.0
Outpost	270		317	26.9
Development	390		696	59.1
	838		1,178	

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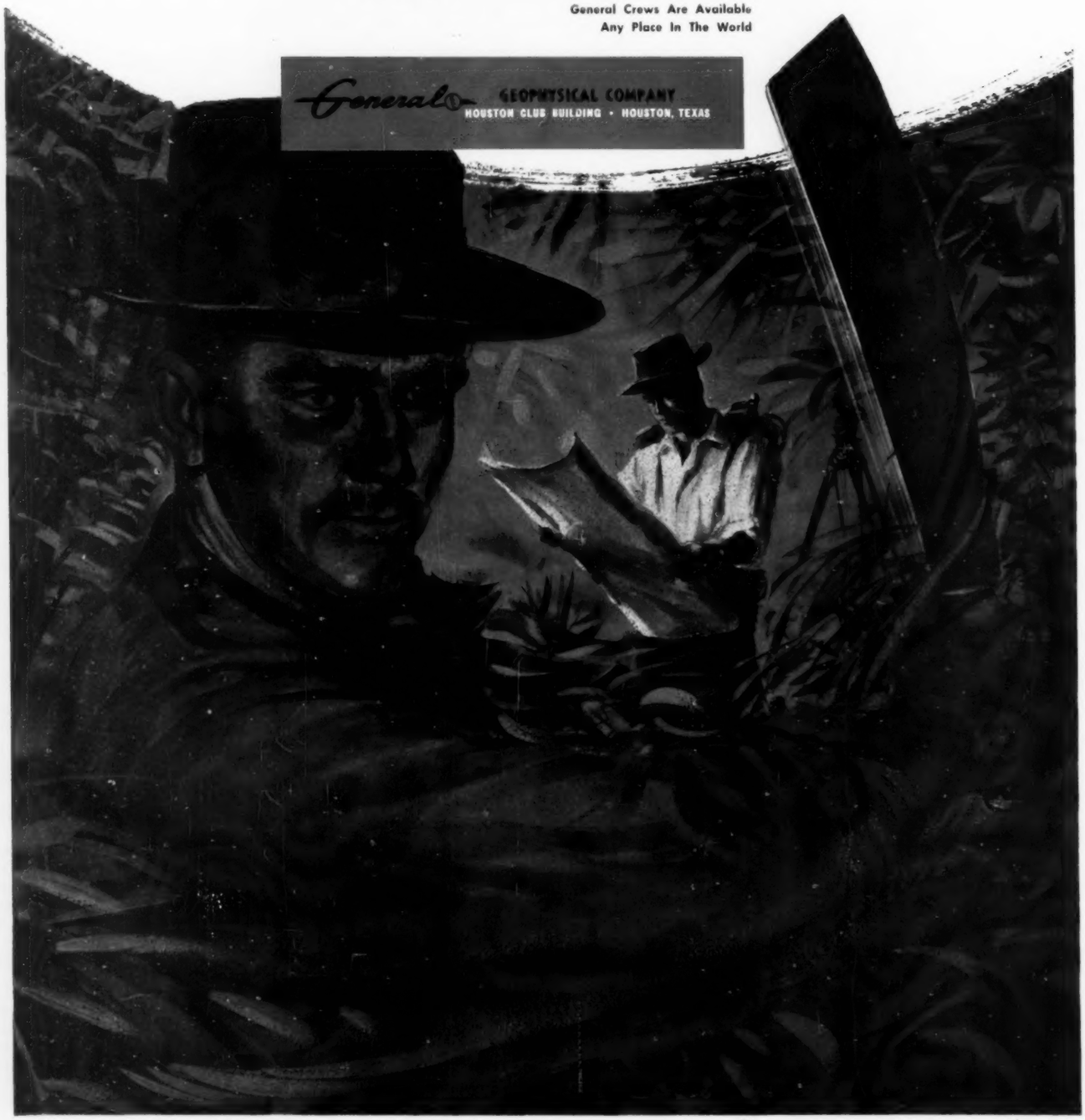

TABLE II

DRILLING IN VENEZUELA—9 MONTHS 1956

Company	OIL		GAS		DRY		TOTAL
	Development	Wildcat	Development	Wildcat	Development	Wildcat	
Crude	93	9	—	—	4	10	116
Mene Grande	223	16	1	1	11	7	259
Shell group	287	3	—	—	13	4	307
Sinclair	34	5	—	—	2	5	46
Texas	24	2	—	—	4	2	32
Los Mercedes	25	4	1	—	11	17	58
Socony	42	—	—	—	1	—	43
Atlantic	9	6	—	—	2	8	25
Phillips	37	—	3	1	—	2	43
Richmond	51	—	—	—	3	—	54
Pantepec	2	—	—	—	1	—	3
Tolon	13	—	—	—	6	19	19
TOTAL	840	45	5	2	58	55	1,005

the 50-50 principle in its new income-tax law enacted in August 1955 (additional tax, Chap. XII, income-tax law of August 1955).

In its consideration of new concessions, therefore, the government laid down certain conditions which are in addition to the requirements of the law, and which are designed to maximize revenues from the granting of new concessions, as well as to guide development toward certain objectives.

The government specified that there are geographical priorities in the consideration of new concessions: (a) zones adjacent to the international boundaries (presumably this is to encourage exploration in such areas as the Colombian border); (b) other zones of the country where there exist technical and economic reasons for their development (i.e., open acreage surrounded by zones under active exploitation, or free national reserves adjacent to producing oil fields).

Special advantages or considerations which the applicants could offer were specified as follows: 1, increase in the first year's exploration tax; 2, increase of the initial exploitation tax; 3, increase of royalty payment (over 16 2/3%); and, 4, obligation to refine in the country 15% of production (10% was required under the 1943 hydrocarbons law). The minister also specified that, for new concessions, an 8% royalty over and above the 16 2/3% royalty established by the law, or that agreed upon as a special advantage, would be placed on oil produced and which was refined within the Caribbean area not considered—in relation to its refining capacity—a "center of consumption."

Other obligations on new concessionaires included: 1, an obligation to build open cities instead of fenced-in camps; 2, an obligation to cooperate with the government in agricultural, cattle raising, industrial, sanitary, road-building, and communications developments; and, 3, technical aid associated with the hydrocarbons. New concessionaires also were asked to cooperate with the government in conservation of natural resources, especially natural gas. This obligation involves parallel collaboration in the national plan to utilize natural gas and establish petrochemical industries.

During early 1956 the first of the applications were accepted. The government issued a map showing 43 areas in Lake Maracaibo, with the announcement that bids would be accepted on the first 11 of the indicated lots. Presumably the remainder will be let at a later date, but have not yet been granted.

The accompanying map shows the 43 areas

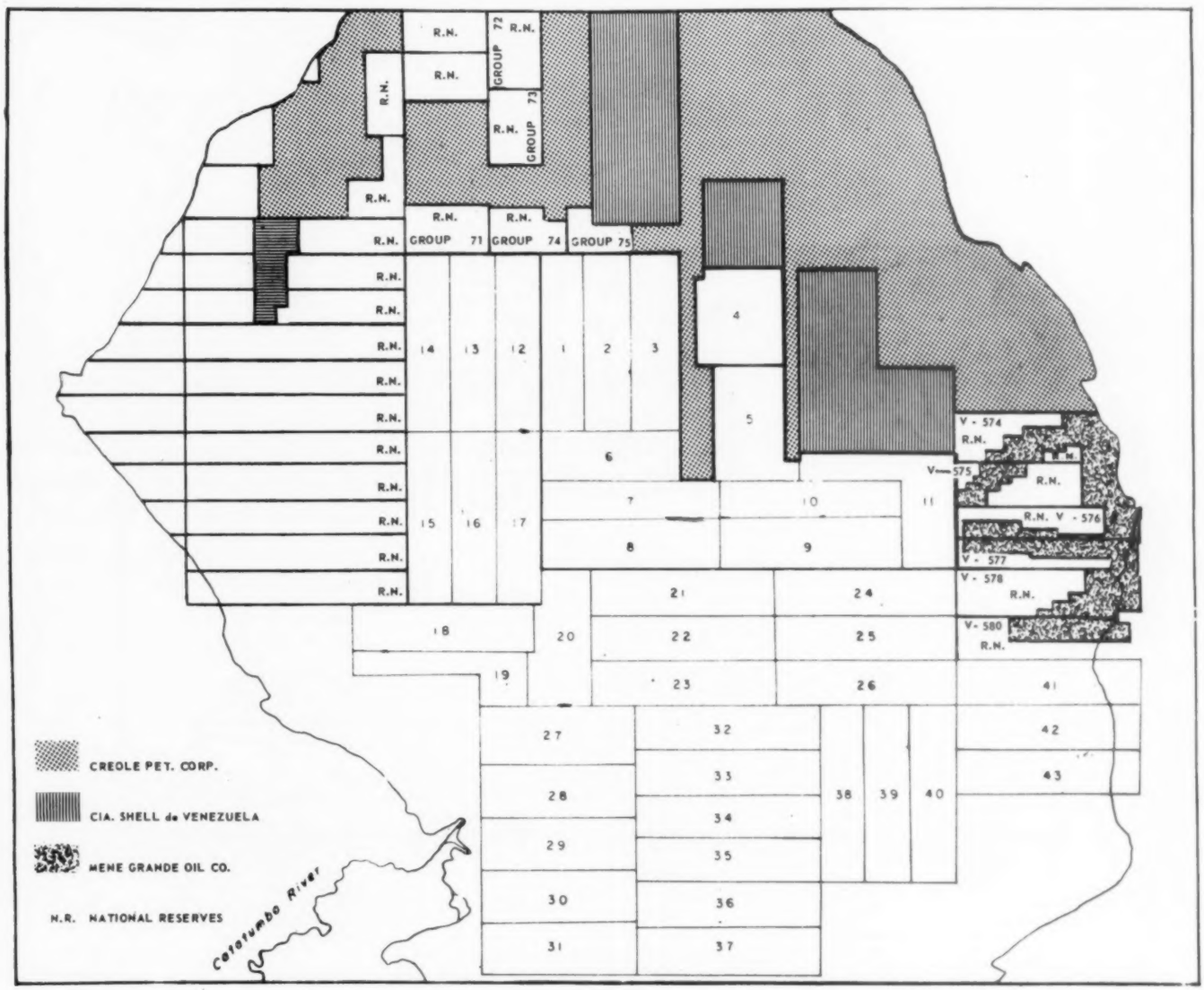

TABLE III

VENEZUELAN CRUDE PRODUCTION

(Barrels Per Day)

Company	Average 1954	Average 1955	Average January-June 1956
Creole	823,710	982,364	1,044,234
Shell	564,141	607,420	688,983
MGO	292,207	316,732	348,758
Socony	66,148	70,009	90,616
Mercedes	24,823	24,370	24,082
Richmond	34,432	45,092	50,648
Texas	30,723	47,965	47,727
Atlantic	20,656	19,717	19,769
Sinclair	20,188	24,739	29,452
Phillips	8,315	9,245	10,596
Pantepec	8,095	7,584	5,578
Talon	1,238	1,694	2,319
Caracas	149	122	109
Coro	484	163	—
TOTAL	1,895,309	2,157,216	2,362,871

indicated by the government. The first 11 lots offered quickly were taken as follows (numbers in parentheses refer to the lot numbers on the map): Cia. Shell de Venezuela (7,8); Mene Grande Oil Co. (2,3,6,11); syndicate composed of Hancock Oil Co., Standard Oil Co. (Ohio), Pure Oil Co., and Signal Oil and Gas Co. (4); Creole Petroleum Corp. (5); Star Oil Co. (9); Venezuelan American Independent Oil Producers Assn. (10); Sun Oil and Atlantic Refining companies (1)

Later bids were invited on the following areas (also shown on the map) and granted to the following companies:

Location	Area in Acres	Granted To
Grupo (Group) 75	7,774	Superior Oil Co.
NW Lot V 574	10,185	Cia. Shell de Venezuela
Central Lot V 574	2,078	Venezuelan American Oil Producers Assn.
Central Lot V 575	10,697	Mene Grande Oil Co.
NW Lot V 575	1,969	Venezuelan Leaseholds CA
NW Lot V 576	9,985	Mene Grande Oil Co.
	42,688	

The grants in Lake Maracaibo were followed by invitations to companies for concession bids on border areas. Applications were made by established companies, as well as by dozens of newcomers to Venezuela who came mainly from the ranks of American independent operators. Some of the payments which were made to the government for these new concessions were extremely high. An incomplete list is given in Table IV.

TABLE IV

NEW CONCESSION PAYMENTS IN VENEZUELA

Company	Area (in acres)	Payment
Venezuelan Leaseholds	Lake Maracaibo, 1,969	$ 3,600,000
Venezuelan Leaseholds	Apure, 24,710	450,000
Venezuelan American	Lake Maracaibo, 26,751	19,800,000
Venezuelan American	Zulia, 98,840	1,800,000
Signal group	Lake Maracaibo, 27,608	31,200,000
Signal group	Zulia, 74,130	1,300,000
Star	Lake Maracaibo, 24,710	18,000,000
Star	Zulia or Tachira, 24,710	450,000
Mene Grande	Lake Maracaibo, 126,829	124,800,000
Mene Grande	Apure, 98,840	1,800,000
Shell	Lake Maracaibo, 59,605	62,100,000
Shell	Zulia, 49,420	900,000
Shell	Tachira, 49,420	900,000
Creole	Lake Maracaibo, 25,441	23,100,000
Creole	Apure, 54,362	900,000
Creole	Zulia, 44,478	800,000
Superior	Lake Maracaibo, 7,774	20,400,000
Superior	Apure, 24,710	450,000
Sun group	Lake Maracaibo, 24,710	17,100,000
Sun group	Apure, 24,710	450,000
	893,727 acres	$330,300,000

In Lake Maracaibo, in addition to the cash bonuses given for new acreage in recent bidding, other incentives have been offered to the government. They include 25% royalty by the Sun-Atlantic syndicate, plus $500,000 to the oil welfare and education fund; aerial magnetometer and scintillator surveys of government areas by Mene Grande; and a 15-year gas-supply contract for 2.1 billion cubic feet yearly by Cia. Shell de Venezuela. Venezuelan American Independent Oil Producers Assn. accepted a commitment to refine 30% of its production in Venezuela (double the 15% minimum) plus 20% royalty, plus $19.4 million bonus on 24,700 acres. Signal Exploration pays 20¼% royalty, plus $31.2 million bonus ($1,220 per acre).

International Petroleum Co., an affiliate of Jersey Standard, has acquired a 25% interest in 2 exploration concessions obtained by Mene Grande in Lake Maracaibo. Area of the concessions is about 21,262 acres. The cost to International was about $7.25 million. International will also share in 25% of future concessions obtained by Mene Grande.

Bids now have been submitted on the latest promising Venezuelan exploration area: the Barinas basin.

Meanwhile, considerable realignment of concessions is taking place on those already given. Five USA companies have signed an agreement with Venezuelan Leaseholds for drilling in the company's new Lake Maracaibo concession area. They are: Tennessee Transmission Co.; Union Oil and Gas Corp., Louisiana; Lion Oil Co.; Murphy Corp.; and San Jacinto Petroleum Corp. San Jacinto will serve as operator. Venezuelan American Independent Oil Producers Assn. has farmed out Lot V 574, recently received in Lake Maracaibo, to the Atlantic Refining Co. and Sun Oil Co.

Production

Crude production during 1955 was a daily average of 2,157,216 bbl, an increase of 42.4% in the 5-year period 1950-54, and a 13.82% over the 1954 average.

Of total production, 70.29% was produced in the Zulia (Maracaibo) fields. The balance of 29.71% came from eastern Venezuela and other fields.

Creole Petroleum Corp. continues to lead the 15 operating companies as the largest producer in Venezuela, with 45.54% of the nation's production. Cia. Shell de Venezuela is second, with 27.22%; and Mene Grande Oil Co. next, with 14.68%. Thus these 3 companies produce 87.44% of the nation's oil. The remaining 12.56% is produced by the other 12 operators.

Reserves

Proved reserves on January 1, 1956 were 12,289,450,800 bbl. The net increase in 1955 (after subtracting the year's production) was equivalent to 13.75% over 1954.

As of December 31, 1955, gas reserves amounted to 23,396,019,396 cu ft. The gross increase for the year was 3,093,930,168 cu ft, and the net increase after discounting the year's production was 2,379,775,146,000 cu ft.

Transportation

There is a total of 2,116 miles of pipelines in Venezuela, with a total capacity of 5,084,293 b/d as of January 1, 1955. The majority of these pipelines are for the transportation of petroleum from the Lake Maracaibo region to the coast, and from the eastern fields to the coast around Puerto La Cruz.

Refining

Total refining capacity in Venezuela, as of mid-1956, was 519,000 b/d of crude throughput

TABLE V

VENEZUELAN REFINERIES—LOCATION AND CAPACITY

Name of Company	Plant Location	Crude Capacity	Type Plant	Cracking Capacity
Creole Petroleum Corp.	Amuay Bay[1]	178,000	S	—
	Caripito	73,000	SC	35,000 T
Mene Grande Oil Co.	Oficina[2]			
Phillips Oil Co.	Santa Ana	3,500	WAX	—
Shell: Colon Development Co. Ltd.	Casigua	1,000	S	—
	La Rivera	300	S	—
	El Calvario	300	S	—
Compania Shell de Venezuela Ltd.	San Lorenzo	38,000	S	—
	Cardon[3]	145,000	SCL	25,000 T
Sinclair Oil & Refining Co.	Puerto La Cruz	35,000	S	—
Texas Petroleum Co.	Tucupita	10,000	S	—
Venezuela Gulf Refining Co.	Puerto La Cruz[4]	59,000	Comp.	23,000 T

(1) 11,000 b/d Hydroforming capacity. 100,000 b/d atmospheric distillation unit complete August 1956.
(2) Dismantled.
(3) 8,500 b/d thermal reforming capacity. A 66,000 b/d feed preparation unit. A 33,000 b/d catalytic cracker, under construction and a 2,300 b/d alkylation unit projected; complete first quarter 1957. Also projected is a 80,000 b/d distillation unit; complete mid-1958.
(4) 4,000 b/sd thermal reforming capacity. A 8,660 b/d fluid catalytic cracker. A 100,000 bbl and 10,000 b/sd copper sweetner.
Note: Richmond Exploration Co. to build 10,000 b/d refinery at Bajo Grande.

TABLE VI

REFINERY OUTPUT, BY PRODUCTS, FIRST 8 MONTHS 1956

(CUBIC METERS)

	August	Cumulative January-August
Crude refined	3,333,577	22,514,518
Crude mixed with refined products		348,487
Reprocessing and other refinery production:		91,209
Fuel oil	1,765,703	12,719,473
Diesel oil	433,126	2,827,348
Gasoline and naphtha	432,087	2,879,776
Gas oil	253,003	1,564,472
Kerosine	94,363	713,992
Residual	59,106	494,323
Aviation gasoline	20,764	184,704
Gas	34,367	213,245
Lubes	14,574	129,859
Asphalt	48,348	200,206
Other	184,217	982,134
Losses	2,307	44,682
TOTAL	3,341,965	22,954,214

TABLE VII

REFINERY OUTPUT IN VENEZUELA, BY COMPANIES, IN 1956 (CUBIC METERS)

Company	August	Cumulative January-August
Compañía Shell de Venezuela Ltd. Refinería de Pta. Cardón (Falcón)	946,140	7,382,718
Creole Petroleum Corp. Refinería de Amuay (Falcón)	1,184,356	6,845,690
Compañía Shell de Venezuela Ltd. Refinería de San Lorenzo (Zulia)	190,650	1,537,539
Richmond Exploration Co. Refinería de Bajo Grande (Zulia)	112,653	614,278
Colon Development Co. Ltd. Refinería de El Cubo (Zulia)	3,079	23,283
Creole Petroleum Corp. Refinería de Caripito (Monagas)	425,970	2,961,700
Texas Petroleum Co. Refinería de Tucupita (Territorio Delta Amacuro)	24,056	191,224
Venezuela Gulf Refining Co. Refinería de Puerto La Cruz (Estado Anzoátegui)	290,391	2,211,496
Sinclair Oil & Refining Co. Refinería de El Chaure (Estado Anzoátegui)	56,930	417,276
Creole Petroleum Corp. Refinado por Sinclair El Chaure (Estado Anzoátegui)	69,000	447,654
Socony Mobile Oil Co. de Venezuela Refinado por Sinclair El Chaure (Estado Anzoátegui)	24,554	229,431
Phillips Petroleum Co. Refinería de San Roque (Estado Anzoátegui)	14,186	91,925
TOTAL	3,341,965	22,954,214

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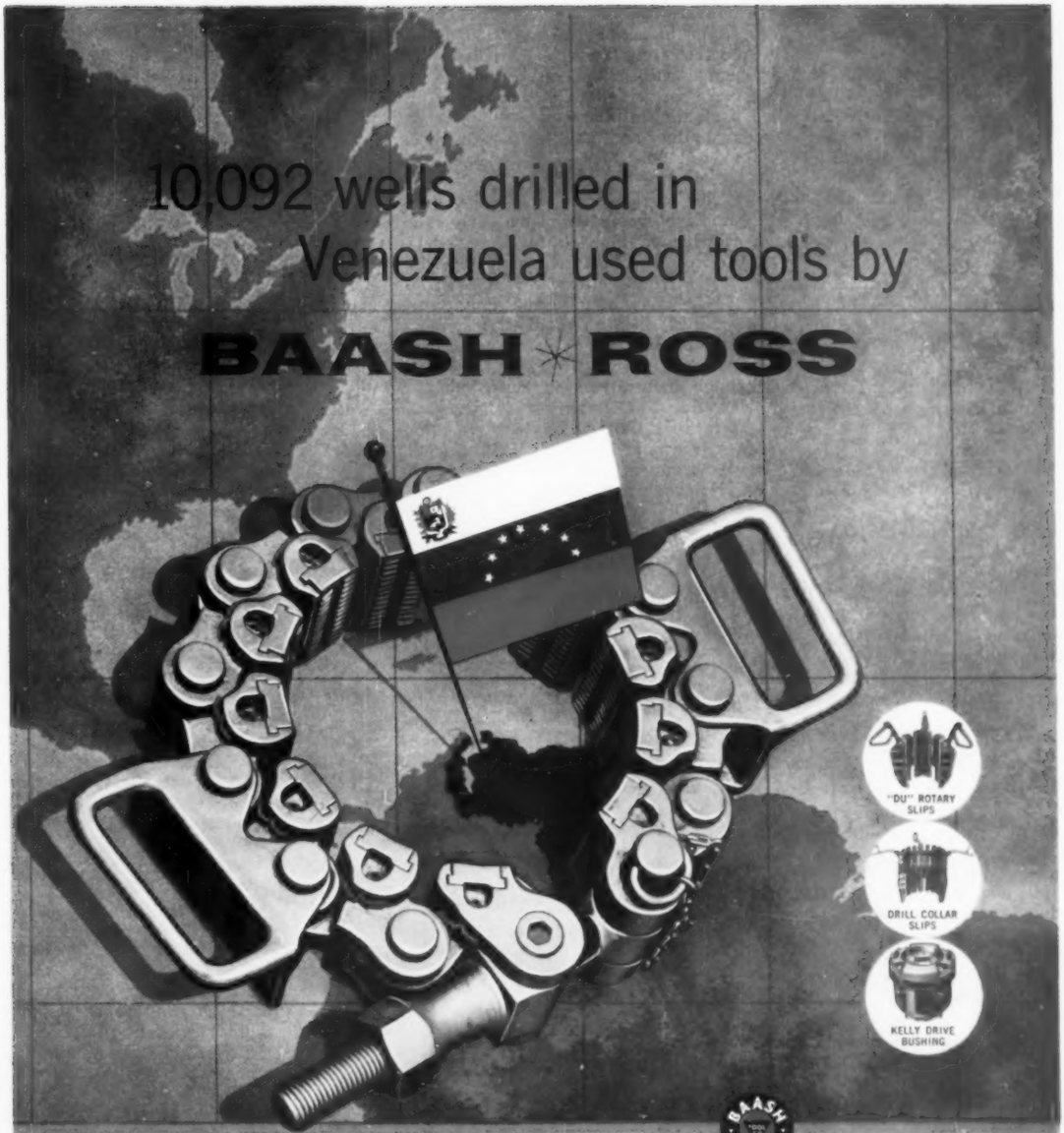

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capacity of which 78,000 b/d represented cracking facilities. The location and capacity of plants is given in Table V.

In 1955 throughput was 195,872,487 bbl, or 536,637 b/d. Products (in barrels) were: fuel oil, 103,734,152; gasoline and naphtha, 25,940,124; diesel oil, 26,436,606; gas oil, 16,189,768; kerosine, 7,548,145; still gas (burned or fuel) 2,037,148; narrow cut lube distillate, 1,101,488 (also finished lube oil); asphalt, 988,769; and miscellaneous, 11,803,632.

Refining capacity is undergoing considerable additions, which are scheduled to bring it toward the 750,000 b/d mark in 1958, and to about 1,000,000 b/d in 1960. The latest addition is a 10,000 b/d plant at Bajo Grande, on the west shore of Lake Maracaibo. It is the Richmond Exploration Co. refinery referred to in the footnote to Table V.

Creole Petroleum Corp. has raised its capacity to 294,000 b/d, and may double same by 1960. This program would lift the Amuay plant to about 500,000 b/d. The capacity of the Caripito plant is also to be expanded.

Cia. Shell de Venezuela is the largest refinery, and plans to add an 80,000 b/d distillation tower in 1958 to make its Cardon refinery capable of processing 255,000 b/d. A 35,000 b/d catalytic cracker is to be added in 1957, plus an alkylation unit. Capacity in 1958 will reach 293,000 b/d.

The government plans to have a 3,000 b/d refinery in operation in 1957 in connection with its petrochemical plant at Moron. The government has a $150 million petrochemical expansion plan under way, and recently has taken over its construction through the new Petrochemical Institute.

Marketing

The largest part of all Venezuelan production is exported. The percentage of crude exports has been declining due to growing domestic refining capacity (with consequent rise in refined exports), and the rising internal demand.

Domestic consumption of petroleum is handled principally by two large concerns, the Shell and Creole companies. During the 1938-51 period, this consumption rose from a total of 2,001,000 bbl to 20,881,000 bbl. Consumption total in Venezuela in 1955 was 38,812,760 bbl (106,336 b/d). Major products consumed (in barrels) were: residual fuel oil, 11,649,772; gasoline, 10,416,391; fuel oil, 6,517,428; diesel oil, 3,216,121; kerosine, 2,910,408; and asphalt, 899,099.

Interior prices of petroleum products are controlled by the government. As of March 31, 1955, regular-grade gasoline at Ciudad Bolivar and Caracas was 11.3 USA cents per gallon, using the exchange rate of 29.85 USA cents per bolivar. This included 2.3 USA cents duty, and 1.1 cents tax. Premium-grade gasoline of 90-octane rating is not considered an essential item, and is subject to less control. Its price is 23.8 cents per gallon at Ciudad Bolivar, or 22.7 cents per gallon at Caracas. Both prices include 4.5 cents duty and 2.2 cents per gallon taxes.

TABLE VIII

VENEZUELAN EXPORTS OF CRUDE—1955

(Barrels)

Destination	Amount
Aruba	169,537,301
United States	140,443,755
Curacao	106,483,517
Canada	67,552,845
Netherlands	20,418,510
Brazil	16,512,049
British West Indies	16,490,977
United Kingdom	13,993,250
Argentina	13,894,170
Uruguay	5,450,405
Italy	4,772,217
France	3,608,730
Canary Islands	3,056,286
Germany	3,050,078
Puerto Rico	3,045,700
Chile	2,000,188
Belgium	1,417,080
Sweden	947,840
Norway	657,871
Israel	464,246
Australia	372,374
Cuba	238,341

Total 594,407,730 bbl (1,628,514 b/d).

OIL LAWS

The laws governing oil in Venezuela at present have evolved from the early statutes, some of which date back to decrees by the royal crown of Spain. A decree of the early 11th century reserved mineral rights to the State. In 1602 the Law of the Indies applied the Spanish mining laws throughout the colonies. The first petroleum ordinance was enacted in March 1918. It was followed by the 1920 petroleum law which, in turn, was followed by the petroleum law dated 1922. The 1922 law was the basic statute of Venezuelan legislation, and subsequent laws in 1925, 1928, 1936, and 1938 did not vary from its basic principles.

The governing law in Venezuela at present is the Law of Hydrocarbons of March 13, 1943, and its regulations as published on August 31, 1943 and amended in 1954. It replaced the previous governing law dated December 21, 1938. Under the 1943 law, the petroleum industry, except in its marketing phases, is declared a public utility.

The regulatory agency for the Venezuelan government is the Ministry of Mines and Hydrocabons, known in Spanish as the Ministerio de Minas e Hidrocarburos. There are no prohibitions contained against the participation of foreigners in petroleum activities unless they are connected with a foreign government, in which case they are absolutely prohibited from acquiring such rights. The same prohibitions apply against certain specified members of the Venezuelan government.

The law covers petroleum activities from exploration through transportation and refining. In no case do oil rights confer ownership of the areas or petroleum involved, but only the right to explore and/or exploit for a definite period. In addition to the law's requirements, the federal government is entitled to stipulate "special advantages for the nation," and in concession applications it must be stated whether the applicant is applying under the ordinary provisions or is willing to offer specified special advantages.

Exploration outside concession areas is freely permitted. Surface geology and geophysics may be freely undertaken, subject only to certain minor formalities. Notice in writing must be given to the Minister of Fomento at least 15 days prior to the date when the exploration work is to be effected, indicating the approximate area of the zone where the exploration work is going to be effected—stating, whenever possible, whether the public or municipal lands are under rental or occupied by plantations, constructions, or established holdings.

EXPLORATION-EXPLOITATION RIGHTS: Concessions for exploration form part of an exploration-exploitation contract, grantable on dry lands or submerged areas. The maximum size of the exploration area is 10,000 hectares, or about 25,000 acres. There is no limitation on the number of concessions which may be held by one individual or company. Duration of exploration rights is three years, with possible extension for an additional six months.

Exploration and exploitation concessions may cover:

(a) Free lands: Lands on which a concession application has never been made.

(b) Lands on which concessions have been renounced, forfeited, or annulled: These lands are considered free zones under the law and,

TABLE IX

VENEZUELAN EXPORTS OF PRODUCTS—1955

(Barrels)

Destination	Amount
United States	59,422,108
Brazil	13,739,525
Curacao	13,101,573
United Kingdom	12,902,016
Sweden	6,912,276
Aruba	4,740,653
Canada	4,665,369
British West Indies	3,642,073
Cuba	2,847,398
Canary Islands	2,252,369
Netherlands	1,981,829
French West Africa	1,908,465
Argentina	1,886,321
Belgium	1,782,291
Puerto Rico	1,577,117
Denmark	1,487,126
Chile	1,476,144
Malaya	1,253,711
Germany	1,089,101
Portugal	959,930
Nigeria	878,148
Norway	803,354
Cape Verde	733,934
Whaling grounds	695,995
Spanish Morocco	563,440
Peru	541,242
Dominican Republic	444,489
Algeria	410,603
Gold Coast	383,603
Belgian Congo	323,784
Australia	300,744
India	248,939
Uruguay	240,939
Guatamala	222,829
Egypt	199,475
Spain	189,341
Liberia	113,553
Nicaragua	107,753
France	97,495
Ivory Coast	61,246
El Salvador	47,413
Virgin Islands	43,502
Gambia	41,125
Honduras	27,488
Paraguay	25,412
Finland	21,329
Sierra Leone	18,499
Haiti	10,630
Colombia	9,636
Costa Rica	8,856
Syria	3,139

Total 147,816,925 bbl (404,978 b/d).

BYPRODUCTS FOR 1955

(Barrels)

Gasoline	10,601,952
Fuel oil	94,766,740
Gas oil	12,762,056
Diesel oil	20,776,008
Kerosine	4,260,395
Asphalt	253,189
Lube oils	1,006,583
Other	3,390,002
Total	147,816,925

TABLE X

VENEZUELAN CRUDE EXPORTS—7 MONTHS 1956

(Barrels)

Aruba	102,359,277
USA	90,606,450
Curacao	69,204,341
Canada	41,455,667
Netherlands	16,369,845
Brazil	11,637,764
United Kingdom	11,542,540
British West Indies	9,789,731
Argentina	8,709,511
Puerto Rico	4,672,835
Uruguay	3,554,014
Italy	2,919,371
France	2,467,460
Canary Islands	2,070,234
Chile	2,059,610
Germany	1,611,341
Belgium	984,718
Sweden	666,778
Norway	379,790
Australia	264,727
Portugal	106,930
Cuba	100,602
TOTAL	383,533,536

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therefore, an application may be made for part or for the entire area of such concession.

(c) National reserves, which have been or are in future renounced, forfeited, or annulled—except the national reserves which the federal executive chooses to set aside and submit to bids.

With the application must be presented a sketch map of the area requested, of rectangular shape and oriented north-south. The details of this map are specified, and a time limit is imposed on its submission. Any excess area which is not granted is considered "sobrante" and reverts to the government. It later may be released for concession by the government, with preference to the original concessionaire if he meets other offers.

The exploration surface tax is two bolivars per hectare or fraction thereof. This is payable yearly in advance, the first payment to be effected within 15 days from date of the resolution ordering issuance of title. A concessionaire is not entitled to a refund in the event the plans are presented prior to the expiry of any year. Concessionaires must request issuance of the corresponding tax bill should the Ministry of Fomento not have done so simultaneously with publication of the resolution referred to previously herein. Subsequent payments must be made within 10 days after the anniversary date of the title.

Failure to pay the first year's exploration tax within one month from date of the resolution ordering issuance of title, or failure to pay second or third year's tax within six months from due date, is sufficient grounds for cancellation of the concession.

Concessionaires are subject to all general taxes, but not to the license tax or any other tax especially burdening petroleum operation. The rights and taxes specified are inherent in the concession, and cannot be altered during its life—a specification which applies to the exploitation period as well.

Concessionaires may receive total or partial exemption from import duties on materials and equipment at the discretion of the government.

EXPLOITATION: Exploitation concessions may be received whether directly or as a guaranteed right (provided concession maps are correctly presented) covering a maximum of half of the original exploration concession in parcels of 500 hectares (about 1,250 acres) per exploitation concession. There is no specified limit on the number of these concessions which may be held by a single individual or company. If, after 30 days, the area is found free of other claims, a period of one year is given in which to submit a map of 1:10,000 scale.

Exploitation concessions may cover:

(a) Parcels selected as a consequence of exploration and exploitation concessions.

(b) Parcels not exceeding 500 hectares on "free" lands or lands on which concessions have been or in the future may be renounced.

(c) National reserves left in execution of previous concessions or of those permitted under the law: These concessions cannot be granted except after the Ministry of Fomento has issued a resolution indicating that bids on such reserves will be considered.

(d) National reserves which have been or may in the future be renounced, forfeited or annulled.

(e) Excess areas ("sobrantes") not previously granted are subject to bids; the concessionnaire from whose concession the "sobrante" (excess area) originates has a preferential right.

Duration of the concession is 40 years. If application is made bteween the 20th and 38th year, the concession may receive one new term of 40 years. The specifications during this latter term under which the concession will operate are to be fixed by the government, and may be not less advantageous to the government than those applying during the concession's original term. On expiration of the concession or its extension, the property and all permanent works constructed thereon become the property of the government.

Concessionaires have the inherent right to transfer their concessions to any individual or company not legally prohibited from acquiring additional acreage in Venezuela.

Concessionaires are required to furnish the government with all data it may require "for

TABLE XI

VENEZUELA AND NETHERLANDS ANTILLES EXPORTS—1955

(Thousands of Barrels)

	Crude Petroleum	Gasoline	Kerosine	Gas and Diesel Oils	Fuel Oil	Lubricants	Asphalt	Other	Total
Canada	67,551	2,311	1,724	5,474	4,845	—	—	—	81,905
Mexico	—	34	—	—	—	—	—	—	34
Newfoundland	—	—	—	—	673	—	—	—	673
United States	141,695	3,494	2,638	5,009	136,883	—	4	9,038	298,761
Total North America	209,246	5,839	4,362	10,483	142,401	—	4	9,038	381,373
Costa Rica	—	260	33	156	225	—	9	3	686
El Salvador	—	382	132	149	158	—	—	5	826
Guatemala	—	732	92	224	563	—	92	5	1,708
Honduras	—	150	20	213	295	—	—	—	678
Nicaragua	—	404	122	343	110	—	48	—	1,027
Panama	—	769	154	2,309	3,324	1	10	3	6,570
Unspecified	—	—	—	—	63	—	—	—	63
Total Central America	—	2,697	553	3,394	4,738	1	159	16	11,558
British Antilles	16,490	289	199	1,698	4,511	1	14	22	23,224
Cuba	239	3,787	—	1,231	6,078	4	—	—	11,339
Dominican Republic	—	668	81	337	740	4	91	6	1,927
French Antilles	—	81	48	20	80	1	—	—	230
Haiti	—	325	27	212	104	2	—	2	672
Netherlands Antilles	—	332	72	3,495	2,628	3	—	—	6,530
Puerto Rico	3,046	131	48	232	3,069	—	6	38	6,570
Virgin Islands	—	23	6	264	104	—	—	—	397
Total Antilles	19,775	5,636	481	7,489	17,314	15	111	68	50,889
Argentina	14,840	416	279	2,642	13,680	46	—	1	31,904
Bolivia	—	22	—	—	—	—	—	—	22
Brazil	12,938	8,957	3,420	7,365	11,158	162	—	833	44,833
Chile	2,000	1,024	497	484	2,530	26	—	179	6,740
Colombia	—	2,250	409	399	10	10	—	—	3,078
Ecuador	—	—	—	24	12	—	—	—	36
Guiana—Br., Fr., and Dutch	—	1	—	—	—	1	—	—	2
Paraguay	—	292	66	99	69	2	—	—	528
Peru	—	—	—	—	1,253	2	—	—	1,255
Uruguay	7,327	272	485	168	611	—	—	—	8,863
Venezuela	—	606	3	—	—	36	—	2	647
Total South America	37,105	13,840	5,159	11,181	29,323	285	—	1,015	97,908
Belgium	2,075	649	42	1,626	1,566	—	—	—	5,958
Canary Islands	3,056	74	—	3,583	3,406	—	—	—	10,119
Denmark	—	1,210	29	1,252	1,626	1	—	288	4,409
Finland	—	5	60	535	417	—	—	—	1,017
France	8,091	271	7	—	191	31	—	—	8,591
Germany	5,022	122	—	3,710	2,791	311	—	—	11,956
Greece	—	127	4	93	668	—	—	—	892
Iceland	—	195	72	129	—	—	—	43	439
Ireland	—	—	—	—	—	—	—	214	214
Italy	5,691	722	—	—	—	—	—	—	6,413
Netherlands	21,497	1,250	747	2,970	1,985	1,159	—	317	29,925
Norway	658	295	188	3,032	2,302	—	—	1	6,476
Portugal	—	685	372	1,442	1,326	20	—	103	3,948
Spain	—	273	116	—	321	3	—	23	736
Sweden	948	2,714	1,340	7,123	2,514	111	—	248	14,998
Switzerland	—	21	17	39	16	—	—	—	93
United Kingdom	17,965	5,593	6,363	8,344	8,202	2,662	—	1,957	51,086
Total Europe	65,003	14,206	9,357	33,878	27,334	4,298	—	3,194	157,270
India	—	—	358	—	—	191	—	1	550
Israel	464	64	1	—	627	—	—	2	1,158
Japan	—	391	—	—	—	—	—	—	391
Lebanon	—	89	2	—	—	—	—	—	91
Malaya	—	513	1	—	1,994	—	—	—	2,508
Saudi Arabia	—	26	—	—	—	—	—	—	26
Syria	—	103	5	—	—	—	—	—	108
Turkey	—	53	—	10	—	34	—	—	97
Total Asia	464	1,239	367	10	2,621	225	—	3	4,929
Australia	897	572	—	—	—	414	—	27	1,910
Indonesia	—	—	—	—	—	—	—	1	1
New Zealand	—	408	—	—	—	15	—	—	423
Total Oceania	897	980	—	—	—	429	—	28	2,334
Africa	—	4,872	1,509	4,363	8,448	190	—	173	19,555
Other countries	—	389	234	6,804	17,891	19	—	51	25,388
Sub-total	332,490	49,698	22,022	77,602	250,070	5,462	274	13,586	751,204
To whaling grounds	—	2	—	284	3,382	—	—	—	3,668
TOTAL	332,490	49,700	22,022	77,886	253,452	5,462	274	13,586	754,872

Source: Ministry of Mines and Hydrocarbons of Venezuela.

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TABLE XII
DOMESTIC OIL CONSUMPTION IN VENEZUELA
(Barrels Per Day)

Year	Total	Gasoline	Kerosine	Gas and Diesel Oil	Residual Fuel Oil	Other
1944	11,062	3,309	1,070	861	5,629	193
1950	51,518	14,828	4,653	7,437	22,826	1,774
1954	89,931	25,179	7,461	15,003	40,001	2,287
1955	106,333	28,537	7,974	17,172	49,771	2,879

a complete knowledge of the development of the oil industry in the country," as well as full geological and geophysical information on the regions studied and wells drilled, after a period not exceeding one year from the time when the work was performed. The pertinent provisions of the law on this subject state that these data will be kept confidential if the concessionaire so requests.

Concessionaires must also present to the Ministry of Fomento, during the month of January, a report containing their proposed exploitation program for the year—indicating the number of warehouses, tanks, pumping stations, and other projected installations. Concessionaires must report on the location, capacity, and other characteristics of the hospitals, schools, labor camps, aqueducts, roads, and other similar work projected for the year.

Taxation includes an initial tax, a surface tax, and a royalty, in addition to general taxes. The initial tax is eight bolivars per hectare or fraction thereof.

This is payable (a) in the case of parcels selected from exploration concessions, within 15 days from date of publication of the resolution regarding maps, whether approving them or ordering their correction; and (b) in the case of direct exploitation concessions as follows: When they cover free zones, tax is payable within the same period as in (a) above; when they cover national reserves or "sobrantes" (excess areas), it is payable within 15 days from date of publication of title.

An annual surface tax is assessed of 5 bolivars per hectare during the first 10 years, rising to 10 bolivars per hectare during the following 5 years; to 15 bolivars per hectare during the next 5 years, 20 bolivars per hectare during the next 5 years, 25 bolivars per hectare during the next 5 years, and 30 bolivars per hectare during the remaining 10 years of the concession. These range, in USA currency, from 60.40 cents during the first year to $2.62 per acre during years 30 to 40. If an extension of 40 years is received, a special tax is payable of 20 centimos per hectare and for each year by which the total duration of the concession is increased by the new term.

This tax becomes payable (a) in the case of parcels selected from exploration concessions, from the time Fomento issues resolution regarding maps, whether approving them or ordering their correction; and (b) in the case of direct exploitation concessions as follows: When they cover free zones, at the same time as in (a) above; but when they cover national reserves or "sobrantes," it is payable from the time title is published.

Royalty on production of crude oil and asphalt is 16 2/3% of production. It is payable in cash or in kind at the selection of the government. The government is authorized to reduce the royalty rate when it can prove that total taxes do not permit commercial exploitation. The royalty rate on natural gas is also 16 2/3%, levied on gas used as fuel or otherwise. Flared gas does not pay royalty.

After the first 10 years total royalty payments made during one quarter are deductible from the amount due in respect of surface tax for the following quarter, but minimum surface tax payable after said deduction will be 1.25 bolivars per hectare per quarter.

When paid in cash, the royalty is based on the market value of the crude at the producing field, minus ½ centimo per cubic meter per kilometer of the pipeline distance between the producing field and the Venezuelan port of exportation. If this value cannot be determined, the value of a similar crude shall be used—with any foreign-exchange costs which might be involved included. In any case, there are established minimums running from 22.95 bolivars per cubic meter for crude with an API gravity of 42 or higher down to 13.20 bolivars per cubic meter for crude with an API gravity of 18 or lower. Agreements may be made between the government and the operators for determining these values, with both parties at liberty to renounce such agreement at any time.

The determination of these values has formed one of the points of issue between the government and the companies. The law provided the values could be determined by quotations for government royalty oil in the domestic Venezuelan market, by comparing it with a similar crude which has a wide market, or comparison of the value of products to be derived therefrom. This comparison with a "reference" crude ignored the fact that no similar crudes were produced in quantity in the United States, and that exact comparison was impossible—especially since Venezuelan crude is heavy and has a high fuel-oil yield (therefore following closely the price pattern of residual fuel oil) which lighter crudes do not.

In 1950, after several attempts, agreement was reached which related the royalty value of lighter Venezuelan crudes of 25 API gravity or higher to equivalent Texas crudes. Heavier Venezuelan royalty crude of 14 API gravity was priced at bunker "C" or residual fuel-oil price minus one USA cent loading charge. For crudes with a gravity between 14 and 25 API, the price was determined by straight interpolation between the price for 14 API crude as given above and 25 API, determined as given above. On crudes and residual shipped to the USA, it was, and still is, customary to grant remission of the 10.5 USA cents import duty.

For deduction of the USA import tax, companies in Venezuela shipping oil to the United States multiply the number of barrels exported to the USA times the USA duty rate. The result is in dollars; times the total concession production, it results in the duty deduction in dollars per barrel. It varies constantly, of course, with amounts exported and total production.

Crudes remain subject to minimum values expressed in the law, however. Provision was also made for comparison of actual values producers received for their crudes with royalty values and adjustment of any discrepancies.

The agreement with the oil companies as regards valuation of royalty crude is not regarded by the companies as expressing the actual value of the oil, and the reservation was made by them that the formula applies *only* to the royalty.

Concessionnaires are given the right of total or partial exemption from import duties on equipment and materials directly related to operations, at the government's discretion.

Concessionnaires, both in exploration and exploitation phases, are obligated to furnish all data necessary to the government's complete knowledge of operations, including a yearly report covering a list of concessions held, statement of drilling operations performed, and of refining and transport operations, total taxes paid, number of employees. A report must also be made concerning transfers, which then may be freely performed unless the person to whom transfer is to be made holds more than 300,000 hectares under exploration-exploitation contract or 150,000 hectares under exploitation contract, in which case prior permission must be received from the government.

Any concession may be freely renounced at any time. Concessions are forfeited if taxes are not paid promptly.

Fines are provided for infractions by any concessionnaire, ranging from 100 to 10,000 bolivars.

Transportation, Refining

Concessions for transportation, by pipeline or other means, and refining of petroleum are considered an inherent right of exploitation concessionnaires, or may be granted by special concession to any qualified party. The stimulation of refining is a special objective of the law, and is encouraged by the government. At present concessionnaires, by regulations other than the 1943 law and regulations, are required to refine one-tenth of their production within Venezuela.

Duration of transportation and refining concessions is 50 years, subject to extension for a similar period. Rates for pipelines must be submitted for government approval. Encouragement of refining and transportation is given by exemption from import duties on materials and on crude petroleum imported for refining or transportation. The obligation to refine may constitute one of the special advantages offered by applicants for concessions.

NATIONAL FACTORS

Given the favorable national attitude toward foreign investment in the petroleum industry and the considerable political stability which has preserved the continuity of investment favorability throughout a long period, an important aspect of investment in the country is taxation.

In addition to the financial and royalty obligations, concessionaires are subject to income taxation, an arrangement which has evolved into the now famous 50-50 split of net income before foreign taxes between the government of Venezuela and the companies. The Venezuelan income tax first was put in its present form in 1942 and was modified slightly and re-issued, July 26, 1955, to take effect January 1, 1956. Under the law, the oil industry is subject to three different taxes on its income. The first is the basic tax of a flat 2.5% on all enterprises, petroleum or other—from which are allowed various deductions, including deductions for cost of acquiring concessions, exploration costs, costs of wells, production facilities, roads, etc.

The second tax is the surtax on net income, varying from 1.5% on 9,000.01 bolivars (about $2,900) to 26% on income in excess of 28,000,000 bolivars (about $9,061,500). On net income between 14 million and 20 million bolivars (about $4.5 to $6.5 million) that portion of one-half the excess over the first amount of $4.5 million exceeding the value of investments made by the concessionaire for increasing production is subject to 19% tax and the remainder to 21% tax. For incomes between 20 million and 28 million bolivars, the rates are 20% and 23%, respectively; and in excess of 28 million bolivars they range from 22% to 26%.

Finally, there is an additional tax payable requiring a 50-50 split of the company net income with the government, provided the previous taxes have not brought about such equalization. This 50-50 split was envisaged in the law, but only began in 1945. In determining this taxable excess, the exploration and initial exploitation taxes, as well as foreign taxes, are not deductible. END

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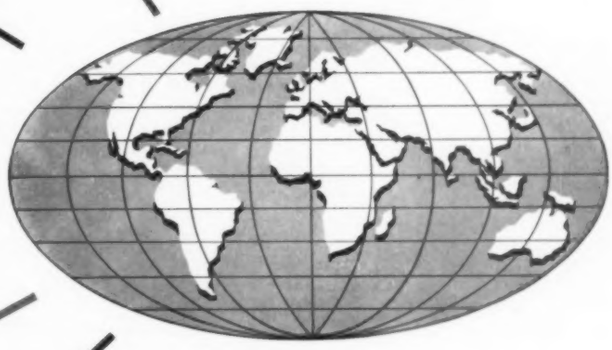

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New Orleans, Louisiana (barite)
Lake Charles, Louisiana (barite)
Zavalla, Texas (clay)
Battle Mountain, Nevada (barite)
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MARACAIBO

MARACA

LA CONCEPCION (Shell)

Río Palmar

EOSCAN (Shell)

40 Km. -19"

TOTUNO (Creole)

BOSCAN (Richmond)

ENSENADA (Richmond)

Sta. Rita

La Concepción

LA SALINA

Cabimas

CABIMAS

URBANETA

UIBOZ (Shell)

TIA JUANA

Zona operada por la Shell

BOLIVAR

Refinería

MACOA (Richmond)

Río Apón

Machiques

SAN JOSE (Richmond)

LAGUNILLAS

LAGO

PUEBLO VIEJO

Campos - Casmias, Tia Juana Pueblo Viejo, Bachaquero y Lagunillas - Zona del lago Operada por la Creole y la Mene Grande

BACHAQUERO

MISOA (Shell)

PERIJA

ALTURITAS (Creole)

SUBCUENCA DEL ZULIA

MARACAIBO

Sup. 67.000 Km.²

Refinería de El Cubo (Shell)

Bobures

RIO DE ORO (Shell)

Río Catatumbo

Río Escalante

Torondoy

San Carlos

LOS MANUELES (Shell)

EL CUBO (Shell)

TIBU

TARRA (Shell)

TARRA W (Shell)

PETROLEA

MERIDA

Lagunillas

Ejido

Chama

Río Negro

Tovar

Bailadores

La Grita

San Juan de Colón

Pregonero

Lobatera

Independencia

San Antonio

Táriba

SAN CRISTOBAL

TACHIRA

Rubio

Río Torbes

Río Zulia

Río Uribante

Río Aguada

Río Aracuca

CURAÇAO (Neth.)

BONAIRE (Neth.)

Península de FALCON

Paraguaná

Pueblo Nuevo

Refinería de Amuay (Creole)

AMUAY

Las Piedras

Carirubana

Refinería el Cardón (Shell)

EL CARDON

REFINERIAS

Golfete de Coro

CORO

La Vela

Pto. Cabello

CUMAREBO (Creole)

ZAMORA

MIRANDA

EL MAMON (Coro)

Capatarida

SUBCUENCA DE FALCON

Sup. 38.000 Km.²

San Luis

Cabure

San Juan

Río Tocuyo

Río Aroa

Río Yaracuy

Río Portuguesa

Río Guanare

Río Guárico

Río Apure

Río Arauca

Río Caura

Río Caroní

Río Orinoco

Río Manapire

Río Unare

Río Neverí

Río Guarapiche

Río Morichal Largo

Río Grande

Río Pao

Río Cabriales

Río Pao

Río Tirgua

Río Aragua

Río Mariara

Río Cabriales

Río Miseria

Río Caroní

Río Paraguaná

Río Matícora

Río Pedregal

Río Mitare

Río Caratal

Río Tocuyo

Río Yaracuy

Río Aroa

Río Tocuyito

Río Turbio

Río Sanare

Río Tinaco

Río Portuguesa

Río Apure

Río Arauca

Río Caura

Río Caroní

Río Orinoco

Río Manapire

Río Unare

Río Neverí

Río Guarapiche

Río Morichal Largo

Río Grande

Río Pao

Río Cabriales

Río Tirgua

Río Aragua

Río Mariara

CURAÇAO (Neth.)

BONAIRE (Neth.)

Isla de Aves (Ven.)

Islas de los Roques (Ven.)

M A R C

PLATAFORMA CONTINENTAL Sup

FALCON

YARACUY

C O R O

LOS TEQUES

CARACAS

D T O F E D E R A L

M I R A N D A

V A R G A S

C O J E D E S

E S T A D O S

G U A R I C O

A N Z O A T E G U I

A P U R E

San Juan

Tucacas

Golfo Triste

Oleoducto Catia de la Mar-Caracas

Maiquetia

La Guaira

Macuto

Pto. Cabello

Turiamo

Aroa

SAN FELIPE

Guama

Montalbán

Bejuma

Chivacoa

Nirgua

Guacara

VALENCIA

Lgo de Valencia

MARACAY

Turmero

La Victoria

Petare

Guatire

Guarenas

Sta. Lucia

Caucagua

Cua

Ocumare del Tuy

Güigüe

Villa de Cura

San Casimiro

San Sebastian

SAN JUAN DE LOS MORROS

Tinaquillo

El Tinaco

SAN CARLOS

El Pao

Barbacoas

El Sombrero

Lagunitas

El Baúl

Calabozo

Arismendi

SAN FERNANDO DE APURE

Achaguas

LECHOSO

FUNDON

LAS MERCEDES

GRICO

PALACIO

WORLD PETROLEUM

Isla Orchila (Ven.)

Isla La Blanquilla (Ven.)

Islas Los Hermanos (Ven.)

A R I B E

+182.9 mts. Prof.

-182.9 mts. Prof.

NUEVA ESPARTA

Los Frailes (Ven.)

ISLA DE MARGARITA

Juan Griego

Sta. Ana

LA ASUNCION

San Juan

Pampatar

Porlamar

Isla Tortuga (Ven.)

Sup. 90.000 Km²

Farallón Centinela

CUENCA DE CARIACO

Sup. 18.000 Km.²

I. Cubagua

I. Coche

Península de Araya

Golfo de Cariaco

REFINERIAS

Higuerote

Río Chico

CUMANA

San Antonio del Golfo

Pertigalete

PTO. DE LA CRUZ

Refinería de Puerto la Cruz (El Chaure) (Meneg-Sinclair)

Refinería de Caripito (Creole)

Cumanacoa

BARCELONA

San Antonio

Pto. Piritu

Refinería de Pto. la Cruz

Refinería de Pto. Píritu (Meneg)

Refinería Tucupita (Texaco)

Clarines

Altagracia de Orituco

QUIAMARE (Meneg)

Caicara

L L A N E R A

GUARICO 253 Km.

BRUZUAL (Shell)

Río Guarico

Río Portuguesa

PLACER-1

BAGUAS

DAKOA (Palmer)

TUCUPIDO (Atlantic)

TAMAN

Zaraza

Arapua de Barcelona

CASCARONCITO (Meneg)

Estación de Bombeo de Arapua

EL ROBLE (Creole)

GUARICO (Socony)

SUBCUENCA DE MATURIN

SN. ROQUE (Phillips)

SN. JOAQUIN (Creole)

ARAGUA (Phillips)

SOTO (Meneg)

ROBLOTE (Sinclair)

APAMATE

LAS OLLAS (Creole)

EL TOCO (Meneg)

EL CHAPARRO (Meneg)

STA. ANA (Meneg)

RINCON (Texas)

CAICO SECO (Meneg)

GUERE (Sinclair)

MANTECO

MAPUEY

ISLA (Meneg)

FRIA (Meneg)

YAGURE (Creole)

SOCORORO (Atlantic)

ELIAS (Creole)

SAN FELIX (Atlantic)

ANIBAL (Atlantic)

COPORO (Creole)

RETUMBO (Atlantic)

MAHOMAL (Sinclair)

ROSITAS (Sinclair)

BELLAVISTA (Phillips)

SARAN (Atlantic)

Valle de la Pascua

Sup. 14

CARITA (Socony)

ARAGUA (Texas)

MATA (Texas)

ZETA (Meneg)

TAPUCO (Meneg)

SOTO E. (Meneg)

MAPIRI (Socony)

BOCA (Socony)

CHIMIRE (Socony)

NIPA E. (Meneg)

OSCUROTE (Socony)

PELAYO (Atlantic)

LEONA

GUARAL (Meneg)

BUCO (Socony)

CM-6 (Meneg)

OS-31

OS-20

OFICINA (Creole-Meneg)

YORALES (Meneg)

AVENTAZON (Meneg)

AREO MEREY (Meneg)

SIMON RODRIGUEZ

I N F A N T E

M I R A N D A

Motatán

Mapire

Caicara

Río Caura

Río Orinoco

Río Asa

Río Aguaro

Río Guanipa

Río Pao

Río Tigre

Río Morichal Largo

Río Caris

Río Cuchivano

Río Sipao

Río Tucupido

Río Manapire

Río Chaviripa

Río Mata

Río Tigueje

Río Ticoporo

Río Suata

Río Tucupita

Río Arigua

Río Guarapo

Río Quebrada Honda

Río Guaniamo

Río Zuata

Río Yuruari

Río Caroní

Río Cuyuni

Río Mazaruni

Río Barima

Río Aguirre

Río Pao

Río Turiamo

Río Guaribe

Río Unare

Río Neverí

Río Querecual

Río Amana

Río Manamo

Río Guarapiche

Río Tigre

Río Morichal Largo

Río Caris

Río Arigua

Río Guanipa

Río Pao

Río Tigre

Río Morichal Largo

Río Caris

Río Cuchivano

Río Sipao

Río Tucupido

Río Manapire

Río Chaviripa

Río Mata

Río Caura

Río Orinoco

Río Asa

Río Aguaro

ORLD PETROLEUM REPO

Isla La Blanquilla (Ven)

Islas Los Hermanos (Ven)

I B E

+182.9 mts. Prof.

-182.9 mts. Prof.

I. La Sola (Ven)

I. Los Testigos (Ven)

NUEVA ESPARTA

I. Los Frailes (Ven)

ISLA DE MARGARITA

Juan Griego

Sta. Ana

LA ASUNCION

San Juan

Pampatar

Porlamar

Isla Tortuga (Ven)

CUENCA DE CARIACO

Sup. 18.000 Km.²

I. Cubagua

I. Coche

REFINERIAS

Refinerias de Pto. La Cruz (El Chaure) (Maraven-Sinclair)

Refineria de Caripito (Creole)

Peninsula de Araya

Golfo de Cariaco

Rio Caribe

Carúpano

Cariaco

El Pilar

CUMANA

San Antonio del Golfo

Pertigalete

PTO. DE LA CRUZ

Cumanacoa

BARCELONA

Pto. Piritu

San Antonio

Caripe

17 Km.-8"-10"

Caripito

Refineria de San Roque (Phillips)

Refineria de Pirital (Maraven)

Refineria Tucupita (Texas)

Arroyo de Maturin

Curines

QUIAMARE (Maraven)

QUIRIQUIRE (Creole)

ARAGUA J-X-6 (Creole)

CROCUAL (Creole)

Caicara

BRUZUAL (Shell)

Sn. Mateo

CERRO PELADO

LAVEA

LA CEIBA (Maraven)

STA. BARBARA (Sinclair)

TRAVIESO (Maraven)

MATA (Atlantic)

MULATA (Creole)

CAPACHO (Creole)

GRANDE (Phillips)

JUSEPIN (Creole)

MATURIN

Jusepin Travieso 26 Km.-16"

Mulata Travieso 12 Km.-10"

Mulata Sta. Barbara 16 Km.-10"

Estación de Bombeo de Arroyo

STA. ROSA (Maraven)

Arroyo de Barrancas

CASCARONCITO (Maraven)

EL ROBLE (Creole)

Zaraza

QUARIO (Socony)

SN. JOAQUIN (Creole)

CERRITO

ARAGUA (Sinclair)

MATA

SOTO E.

ZETA (Maraven)

ORITUPANO (Petrolar)

SN. ROQUE (Phillips)

ROBLOTE (Sinclair)

APARATE

LAS OLLAS (Creole)

TOCO (Maraven)

EL CHAPARRO (Maraven)

STA. ANA (Maraven)

SOTO (Maraven)

TAPUCO (Maraven)

MAPIRI (Socony)

RINCON (Texas)

BOCA (Socony)

CHIMIRE (Socony)

OSCUROTE (Socony)

PELAYO (Atlantic)

MAHOMAL (Sinclair)

COPORO (Creole)

ANIBAL (Atlantic)

SAN FELIX (Atlantic)

CAICO SECO (Maraven)

GUERE (Sinclair)

LOS MANGOS

MANTECO

MAPUEY

ISLA (Maraven)

CM-6 (Maraven)

OS-31

QUICO (Socony)

GUARA N.

LEONA (Maraven)

JUNTA (Atlantic)

RETUMBO (Atlantic)

ELIAS (Creole)

FRIA (Maraven)

YAGUE (Creole)

OFICINA (Creole-Maraven)

SOCORORO (Atlantic)

YOPALES (Maraven)

AREO MEREY (Maraven)

AVENTAZON (Maraven)

GUARAPICHE (Maraven)

SIMON BOLIVAR

LEJOS (Maraven)

JOBO

Sup. 144.000 Km.²

MONAGAS

MIRANDA

Soledad

CIUDAD BOLIVAR

Mottaco

Maipire

MARIA L

ARIMAGUA

ALTAMIRA

RONDON

La Paride

CERRO BOLIVAR

CARLA

R. Caura

R. Aro

R. Tigre

R. Tucupita

R. Pao

R. Guarapiche

R. Orinoco

R. Caroni

R. Yuruari

R. Cuyuni

R. Mazaruni

R. Supamo

R. Caratal

R. Aripao

R. Guasipati

R. Yuruan

R. Paragua

R. Caura

R. Manapiare

R. Ventuari

R. Cunucunuma

R. Casiquiare

R. Negro

R. Atabapo

R. Orinoco

R. Ocamo

R. Padamo

R. Mavaca

R. Siapa

R. Mavaca

R. Ocamo

R. Orinoco

R. Negro

R. Guainia

R. Isana

R. Vaupes

R. Apaporis

R. Caquetá

R. Putumayo

R. Amazonas

R. Solimoes

R. Javari

R. Ucayali

R. Urubamba

R. Madre de Dios

R. Beni

R. Mamore

R. Guaporé

R. Paraguay

R. Tapajos

R. Xingu

R. Araguaia

R. Tocantins

R. Parnaiba

R. Gurupi

R. Mearim

R. Itapecuru

R. Pindare

R. Grajau

R. Turiaçu

R. Pericumã

R. Munim

R. Preguiças

R. Parnaiba

R. Gurupi

R. Mearim

R. Itapecuru

R. Pindare

R. Grajau

R. Turiaçu

R. Pericumã

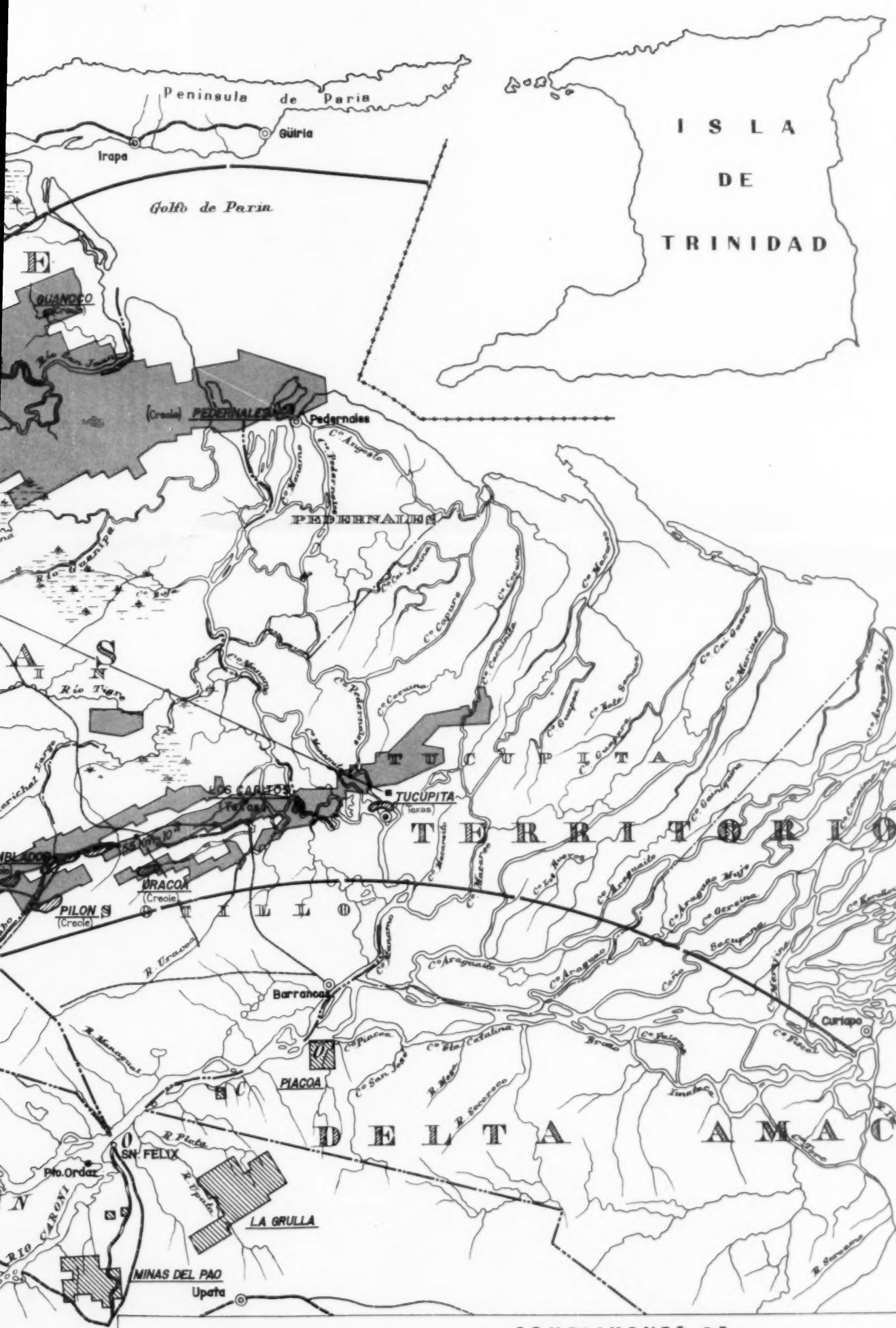
R. Munim

R. Preguiças

LEYENDA

- Campos Petroleros
- Concesiones Petroleras
- Cuencas Petroleras
- Refinerias
- Oleoductos
- Gasoductos
- Plantas de Gas (de Inyección)
- Concesiones Mineras
- Capital de la Republica
- Capital de Estado
- Capital de Distrito
- Carreteras Pavimentadas
- Carreteras sin Pavimentar
- Caminos Carreteros
- Limite Internacional
- Limite de Estado
- Limite de Distrito
- Rios
- Zonas Pantanosas
- MARA Distritos Petroleros
- Plantas de Gas (de

ORT 1957



acional
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trito

nosas
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os (de absorción)

COMPLIMENTS OF

REPUBLICA DE VENEZUELA
MINISTERIO DE MINAS E HIDROCARBUROS
OFICINA TECNICA DE HIDROCARBUROS

MAPA
PETROLERO
DE
VENEZUELA

ESCALA 1:1.000.000

Dib. HENRY [illegible] L. 6-5-58

THE "SPYROS NIARCHOS" the largest

single-screw, single-purpose oil tanker in service, has recently completed her trials.

On an overall length of 757 feet she carries 47,000 tons deadweight and has a maximum power of 20,000 S.H.P. She is propelled by the largest, solid Novoston propeller of Heliston design yet manufactured. It is five-bladed and weighs 30½ tons.

Photograph by courtesy of the builders, Vickers-Armstrongs (Shipbuilders) Ltd.

J. STONE & CO. (CHARLTON) LTD.

OCEANIC HOUSE 1A, COCKSPUR ST., LONDON S. W. 1

the net 0.5 billion barrels increase, however,

446,000 b/d in 1929. In 1939 exports had risen

A still more important deduction is given in

UNITED STATES

Development of petroleum in the United States began with the discovery of the Drake well in Pennsylvania in 1859. The US oil industry has since developed into the largest in the world. Rising consumption levels within the country and a favorable investment climate have enabled the industry to invest the very large sums necessary to sustain such high levels of activity—at the same time matching the annual growth of demand and keeping a substantial reserve capacity unused for emergency purposes.

Historically, the industry maintained its center of gravity in the East during its initial stages, when Pennsylvania and neighboring Appalachian states were the principal producers. Before the turn of the century they were joined by the Ohio-Indiana region.

By the beginning of World War I a pronounced shift had taken place. All the mentioned areas had begun to decline. Their place had been taken by California and Oklahoma, which were supplying 37.5% and 27.7% of production, respectively, in 1914. Texas and Illinois were relatively small producers at that time, but following World War I the center of production began to shift toward its present pattern, wherein Texas and the Mid Continent area predominate.

The task of providing sufficient production to meet demand has been complicated by increased costs. Exploration costs are estimated by industry sources within the US to have risen to 95 cents per barrel from 45 cents over the 10-year period 1944-1953.

The total cost of finding and developing crude-oil production, including exploration, development, and production costs, rose from $1.47 in 1944 to $3.16 in 1953, and has since increased substantially.

Matching this increase in needs and costs, the US petroleum industry spent around $24,000 million in the 1951-55 period to meet the demands made on it.[1] During the 1956-60 period these expenditures, which include those for property, plant, and equipment, are estimated to rise to $32,900 million, and in the 1961-65 period they will rise to $40,650 million.

The larger share of these expenditures, about 70% in the 1951-55 period, went for exploration and production. The percentage spent for exploration and production is expected to decline slightly during the coming 10 years, while refining will rise to about 16% in the same period.

The enormous effort necessary is illustrated by the number of wells. In 1947 a total of 31,026 wells was drilled (excluding service wells). This climbed to 44,516 wells in 1952, and to 56,682 wells in 1955. Total footage drilled rose from 114,061 in 1947 to 226,270 in 1955. In 1956 an estimated 58,600 wells were drilled, and in 1960 this is estimated to rise to 70,000 wells.

Despite this increased drilling, the oil and gas found per well has decreased from 136,680 barrels in 1947 (converting gas to oil at 6,000 cu ft per barrel of crude) to 124,910 barrels per well in 1955, and an estimated 123,100 in 1956. The decline is continuing, and with it the ratio of reserves to production, which in 1947 was 17.9, slipping to 16.4 in 1955 and 16.2 in 1956. It will drop to around 15.5 in 1960.

As a result of decreasing yields and other factors, the US has become increasingly dependent on foreign sources for its oil supply. From a net exporter in 1939 the country had become a net importer of over a million barrels a day during 1956. There are many indications that this trend will continue at an accelerated rate in the future. Most striking is the comparison of the number of dry exploratory holes which are now being drilled. In 1920 just over 20% of wells drilled were nonproductive. By 1955 this percentage had risen to around 40%.

The total number of wells drilled has increased at the rate of 4.3% over recent years, while the footage drilled has increased by 7%, indicating the deeper levels to which drillers must go to obtain production. Added to this is the decreasing number of large fields which have been found.

All these factors have combined to force US companies to search for oil in the more prolific (although not necessarily less expensive) areas outside the United States. This trend toward foreign operations is probably the outstanding recent tendency of the US petroleum industry.

Reserves

The American Petroleum Institute and the American Gas Association estimate proved reserves of crude oil and natural-gas liquids within the United States at 35.4 billion barrels as of December 31, 1955. Natural-gas reserves were estimated at 224 trillion cubic feet, up 12% from 1954 levels.

The increase in reserves of crude and natural-gas liquids indicated was equivalent to about 0.5 billion barrels. This is composed of additions to reserves of 2.9 billion barrels, less production during the year of about 2.4 billion barrels. Of

TABLE I

United States Oil Consumption

(Thousands of Barrels Per Day)

	1956	1957*
Exports		
Crude	29	30
Products	299	303
Domestic		
Motor fuel	3,804	3,967
Kerosine	331	325
Distillate	1,734	1,803
Residual	1,555	1,575
LPGas	443	482
Other	1,032	1,032

*Estimate

[1] "Future Growth and Financial Requirements of the World Petroleum Industry," by Chase Manhattan Bank.

the net 0.5 billion barrels increase, however, only part is composed of additions to reserves. The major portion was brought about by revision of previous estimates and extensions of old pools.

Refining

The US refining industry continues to be dominated by the continual search for higher octanes to meet requirements of the newer automobiles. Added to this is the increasing trend toward use of foreign crudes in domestic refineries. For this latter reason most construction projects and existing plants are located on the east, west, and Gulf coasts, with the interior of the country having only about 38.2% of the throughput during 1955.

Crude runs to stills are estimated to increase to around 8,280,000 b/d during 1957. This is 4% over 1956 runs. Total capacity may reach 10,000,000 b/d during 1959 and about 11,000,000 b/d during 1961.

Refiners in the years ahead will be faced with the problem of expanding processing. Facilities for product improvement have increased about three times as fast as basic crude distillation capacity, and this trend will continue into the future as refiners strive to meet the increased octane requirements of new cars. An accompanying effect is the growing use of hydrogenation, as more hydrogen becomes available from catalytic reforming.

Marketing

Consumption in the United States has been spurred by such factors as the adoption and development of the internal-combustion engine, especially during and after World War I, and the increased utilization of heavy oils in industry. Following World War I demand rose to about 3,022,000 b/d in 1929, nearly a fourfold increase over 1914. During the depression of the 1930's demand rose at a much more moderate rate, to only about 3,891,000 b/d in 1939. The slowdown during the depression was due mainly to the reduced level of industrial activity. This reduction in oil demand was relatively slight, however, when compared with other fuels, whose use dropped precipitously. The overall annual rate of increase in domestic oil use has averaged 5.8% compounded over the past 23 years.

The external marketing picture has shown considerable variation over the years. Imports rose from about 47,000 b/d in 1914 to 353,000 b/d in 1921. At that time they were derived mostly from Mexico. With the increasing political troubles in that country, the decline in economic activity during the depression of the 1930's, plus the imposition of a 21 cents per barrel tax, imports began to decline and fell from about 298,000 b/d in 1929 to 162,000 b/d in 1939.

The marked increases in domestic demand after World War II and maintenance of spare producing capacity increased imports to record heights. By 1946 they had risen to 377,000 b/d, and rose steadily every year thereafter to reach 957,000 b/d in 1952 (of which crude was 573,000 b/d and products were 384,000 b/d) and 1,248,000 b/d in 1955. In 1956 imports were rising rapidly to about 1,473,000 b/d, going principally to the east coast and California, but this trend was interrupted by the Suez Canal crisis. Nominations for 1957 were 1,160,000 b/d of crude, about 31% over 1956 levels during the first six months.

Exports from the United States have shown a diverging trend. From a substantial exporting nation in previous years, the US has been transformed into a deficit oil economy. Exports during 1914 were 149,000 b/d, rising steadily to 446,000 b/d in 1929. In 1939 exports had risen to 518,000 b/d. In the post-World War II period exports declined steadily, with the exception of 1951 and 1952 when they rose temporarily under the stimulus of Korea and the closing of the Abadan refinery. In 1955 exports were down to 365,000 b/d, of which the great majority were product exports. They were headed for 331,000 b/d in 1956, but the Suez crisis altered the picture and during the final months of the year exports from the US were greatly increased to meet the European deficit. The long-term decline in exports is estimated to continue, however, and during 1960 they will be down to around 200,000 b/d.

OIL LAWS

A principal factor in attracting the large volumes of capital investment necessary to development of an industry as large as the oil industry has become in the United States is the consistently favorable legal operational climate which exists and has endured for many years.

In the United States rights to the subsoil are owned by the federal government, state governments, and by individuals. In no other country of the world does such a diversity of rights to the subsoil exist. Regulation of individuals' rights to the subsoil is not systematized, and the arrangements into which they enter with producers (or produce for their own account) are determined only by the needs of the moment and by the forces of competition.

The different state laws are too numerous to review here, but they are broadly similar to the federal regulations.

Generally speaking, however, the important regulation in the United States occurs outside the oil laws themselves. In the case of the federal government, the income-tax provisions are most important and affect all persons concerned, whether producing their own oil or that of the federal or state governments. The state governments often have income taxes of their own patterned after the federal tax, but much lower. They have an effective control of production levels, however, through conservation.

FEDERAL INCOME TAX: The federal tax on corporate income allows oil companies to deduct all the expenses to which other businesses are entitled, in addition to special allowances arising out of the specialized nature of their business. These allowances include use of an alternate form of depreciation from the "straight line" system used elsewhere, depletion, and expensing privileges. The latter grant oil companies the option of deducting in full from oil (and other) income current expenses incurred in exploration and development. These include all intangible costs such as labor, supplies, and fuel used. Costs of physical plant are also deductible, but that salvaged at the end of the operation must be capitalized and recovered by depreciation. Cost of geophysical and geological work can be recovered only if the work was done on what turned out to be a nonproductive property. Deduction of the intangible costs can be applied to either producing properties or nonproductive properties, but is irrevocable once the choice has been made.

Table II

United States Reserves (As of December 31)
(Billions of Barrels)

	1955	% Increase Over 1954
Crude	30.0	+0.5
Natural-gas liquids	5.4	+0.1
Total	35.4	+0.6

A still more important deduction is given in the depletion allowance. This is based on the exhaustible character of mineral properties. It grants a percentage depletion for oil and gas of 27.5% of the annual gross income derived from a property, up to 50% of the net income from same. There is also a cost depletion which may be used as an alternative to percentage depletion. It consists of a series of deductions varying at a rate based on the physical exhaustion. This rate is based on the ratio of production per year to estimated reserves of oil or gas, and the producer may take his choice each year as to which method he wishes to apply. The "adjusted basis" depletion is generally adopted during initial stages when income and production are relatively low.

STATE TAXATION: Many states (with the exception of Texas) levy a corporate income tax which is always much lower but otherwise very similar to the federal tax. Generally, state income taxes give similar incentives (such as depletion) to oil and gas producers; in some cases they are identical. However, in most states the bulk of revenue is derived from taxes other than the income tax.

Primary in importance among state taxes is the severance tax, levied on oil and gas production. Most of the important oil-producing states levy these taxes and derive the major part of their oil income therefrom, including Texas.

CONSERVATION: Regulation by the individual states of the USA is especially important as regards conservation and prorationing. State conservation applies whether production is from public or private lands. The principal federal statute in this regard is the Connally hot oil act, which forbids interstate shipment of any oil produced in violation of state conservation laws.

The individual states' programs are coordinated by the Interstate Oil Compact Commission, which has no legal authority to enforce compliance but acts only in an advisory capacity. It advises such commissions as the Railroad Commission of Texas, the largest producing state.

The function of the railroad commission (and other states' commissions are similar) is defined as administration and enforcement of the state's conservation and proration laws. These are aimed at preventing waste of oil resources, so defined as to include both physical waste, such as production in excess of MER (maximum efficient rate), gas flaring, etc.; and economic waste, which is defined as "production . . . in excess of . . . demand."

In order to prevent waste of oil resources, the commission meets monthly and reviews reports which must be submitted by all persons engaged in the state oil industry's major segments. By considering such factors as purchasers' nominations for crude during the coming month, inventories of petroleum on hand, the imports and exports planned, and the US Bureau of Mines' forecast of demand, the commission arrives at a "reasonable market demand," which is prorated among various producers in the state.

Federal Oil Legislation

The principal governing legislation by the federal government is contained in the Mineral Leasing Act of February 25, 1920, as later amended and supplemented.

Leases under this act are issued by the Department of the Interior through the Bureau of Land Management only to (a) citizens of the United States, (b) associations of such citizens, (c) corporations organized under the laws of the United States or of any state or territory thereof.

EXPLORATION: No exploratory work of any kind is permitted prior to lease issuance, and no

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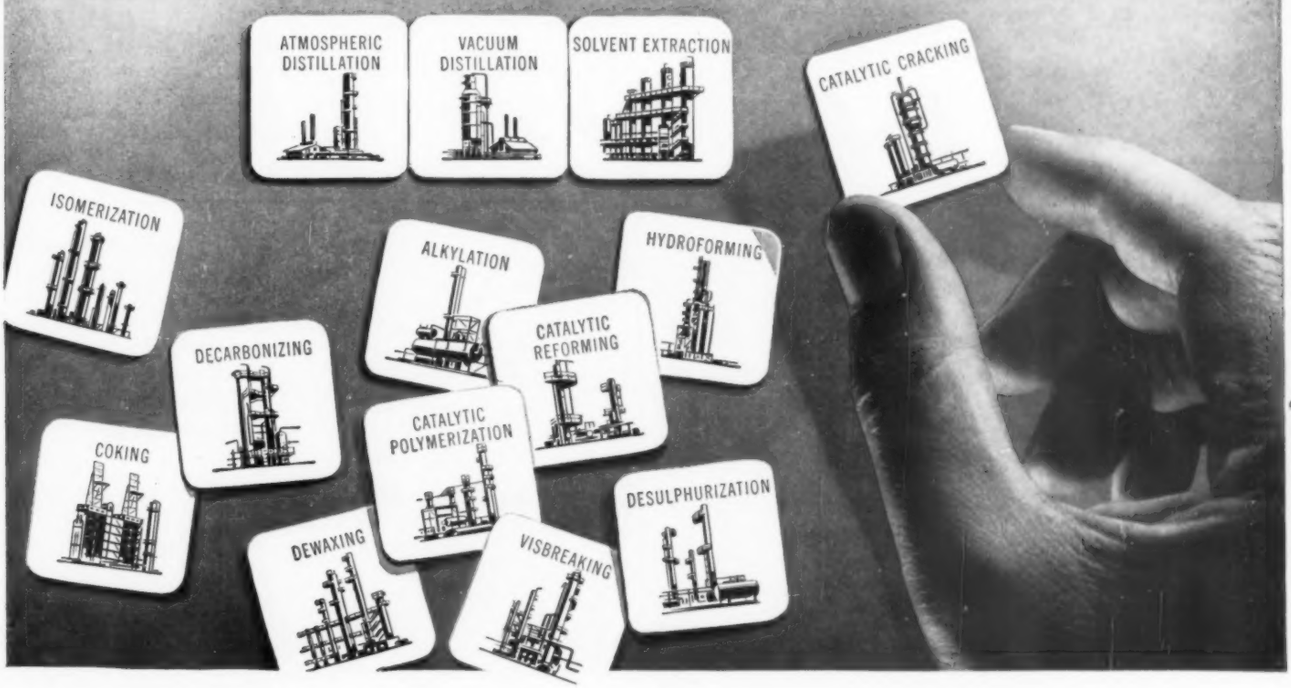

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drilling operations may be commenced under a lease prior to the filing of an acceptable general lease or drilling bond.

Options may be taken only on lands embraced in leases or applications for leases, and the acreage included in options is not chargeable against the optionee's acreage holdings under leases or applications for leases. An option is valid for only three years, except that an option may be taken on an application for lease for the period of time from lease issuance and three years thereafter. No optionee may hold options at any one time for more than 200,000 acres in any one state.

EXPLOITATION: There are two types of oil and gas leases which may be issued under authority of the Mineral Leasing Act: (1) noncompetitive leases, and (2) competitive leases.

Noncompetitive leases are issued for lands which are not situated on a known geologic structure of a producing oil or gas field. Maximum area of such lease: 2,560 acres. Term of lease: 5-year primary term, and so long thereafter as oil or gas is produced in paying quantities. Acreage limitation: No person, association, or corporation may hold leases aggregating more than 46,080 acres in any state, whether directly or indirectly. Royalty is 12½%.

Lands lying within the known geological structure of a producing oil or gas field may be leased only through competitive bidding, in units of not exceeding 640 acres, to the highest qualified bidder.

Under competitive leases, the annual rental prior to discovery is $1.00 per acre or fraction thereof, unless a different rate of rental is prescribed in the lease.

Table III

Capital Expenditure—US Oil Industry
(Millions of Dollars)

Sector	1946-55	% of Total
Production	26,575	69.8
Transportation	3,040	7.9
Manufacturing	5,050	13.3
Marketing	2,870	7.5
Others	565	1.5
TOTAL	38,100	100.0

With respect to noncompetitive leases, the annual rentals are payable in advance at the following rates: (a) If located wholly outside the known geologic structure of a producing oil or gas field: for the first lease year, 50 cents per acre; for the second and third lease years, no rental; for the fourth and fifth lease years, 25 cents per acre; for the sixth and each succeeding year, 50 cents per acre.

The above rentals, under pertinent circumstances, may be superseded by the following: (b) If located wholly or partly within the known geologic structure of a producing oil or gas field: if not committed to a unit plan, beginning with the first lease year or the next lease year after 30 days' notice that all or part of leased land is included in such a structure, and for each year thereafter prior to discovery: $1.00 per acre or fraction thereof; if committed to a cooperative or unit plan which includes a well capable of production and contains a general provision for allocation of production, for lands not included in participating area: 25 cents per acre or fraction thereof for the first and each succeeding lease year thereafter.

All leases provide that, where a $5,000 bond is not already being maintained, a general lease bond in the penal sum of $5,000 conditioned upon compliance with all lease terms covering the entire leasehold is to be furnished by the lessee. Until a general lease bond is filed, a noncompetitive lessee will be required to maintain a bond of not less than $1,000 in cases where a bond is required by law for protection of owners of surface rights. In the case of a competitive lease, bond is at least double the amount of the $1.00 per acre annual rental, but in no case less than $1,000 nor more than $5,000. Such a bond must also be filed when all or part of the land in a lease issued noncompetitively is included within the limits of a known geologic structure of a producing oil or gas field.

Leases may be assigned or subleased as to all or part of the leased acreage and as either a divided or undivided interest therein to any person or persons qualified to hold a lease, subject to final approval by the Bureau of Land Management. Assignments of royalty interests are required to be filed with the bureau for record purposes only, and no formal approval will be given.

A lease or any legal subdivision thereof may be surrendered by the record title holder by filing a written relinquishment, in triplicate, in the proper land office. END

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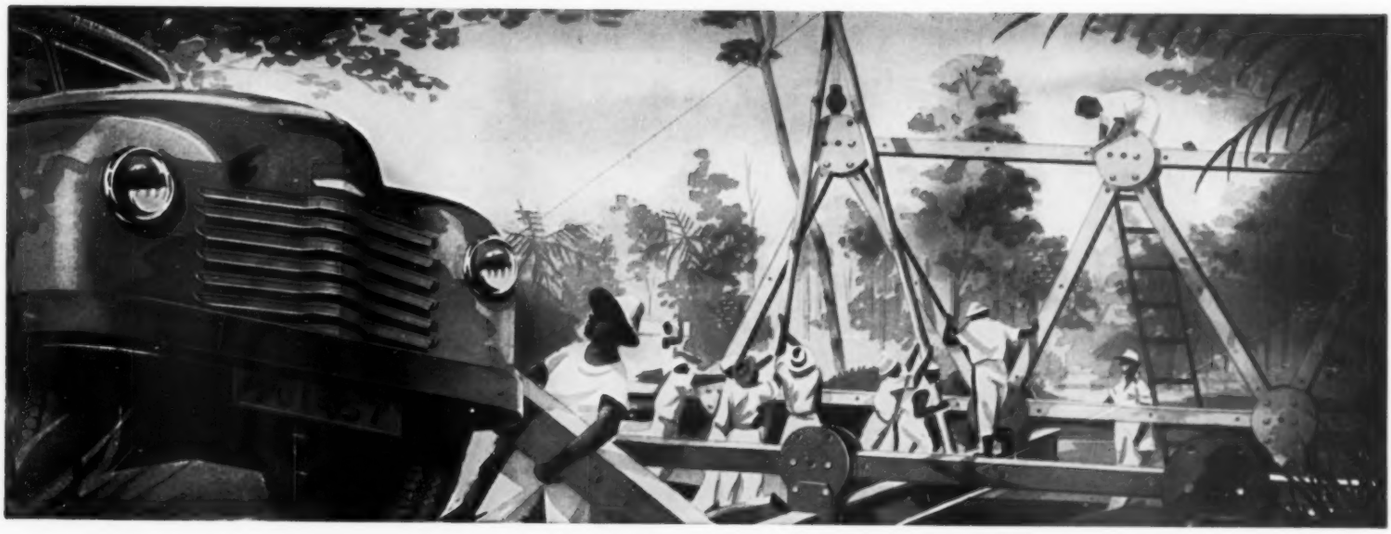

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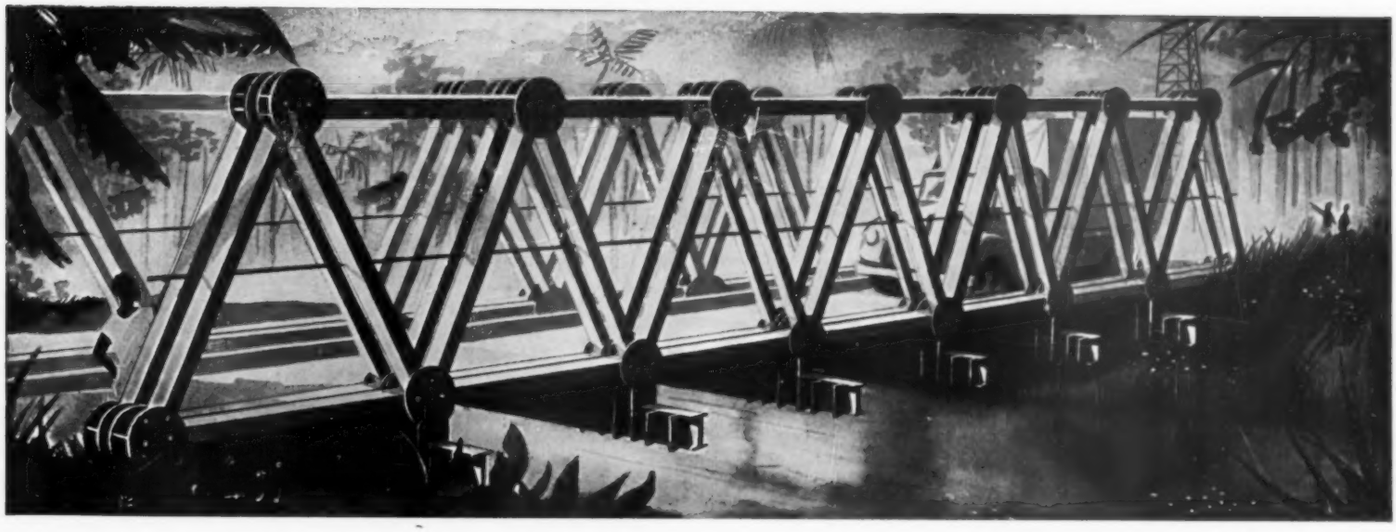

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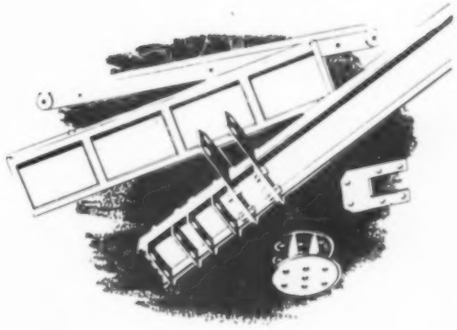

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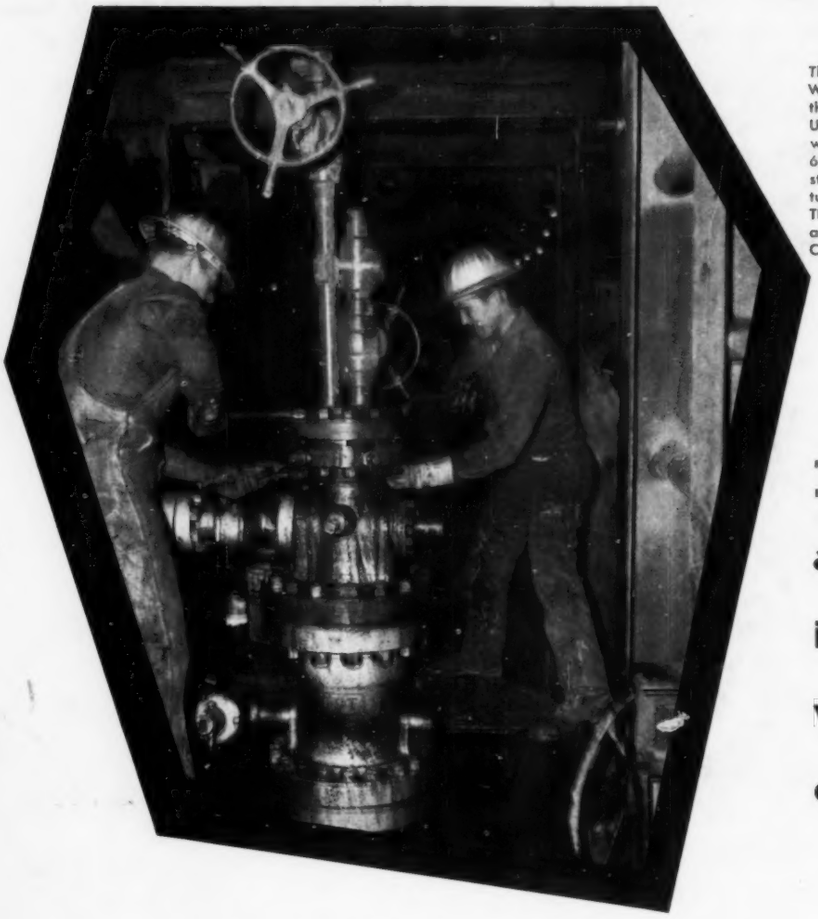

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